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LOCAL FISCAL EQUALISATION IN SWITZERLAND: THE CASE OF THE CANTON FRIBOURG

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1 Introduction

In Switzerland, the system of fiscal equalisation between the intermediate level and the local level of government varies across the twenty-six cantons. This paper aims at introducing some of the common features of canton-level policies of fiscal equalisation between communes, and provides some more specific details on the system applied by the Canton Fribourg.

Starting out with a basic typology of local fiscal equalisation policy and its instruments, section 2 will present the character of local equalisation policy in the Canton Fribourg, with special regard to the peculiarly double-faced phenomenon of a formally vertical but latent horizontal equalisation.

Though the financial capacities of the constituent local communities continue to play a key role in determining the allocation of equalising grants by the Canton, there seems to be no appropriate method for measuring fiscal capacity without violating the principal objective of equalisation policy. Section 3 will show some of the related difficulties.

Section 4 provides a preliminary analysis on the incidence of local fiscal equalisation transfers. For this purpose, a hypothetical amount of 1'000'000 Swiss francs from the budget of the Canton Fribourg will be allocated to the 206 constituent communes on the basis of four different scenarios. This simulation is a preparatory work that paves the way for a more comprehensive analysis of incidences, a mandate given recently by the Cantonal Council to the Chair for Public Finance at the University of Fribourg.

Section 5 summarises the major findings of the study.

2 The characteristics of local fiscal equalisation in the Cantons

Understanding the real character of fiscal equalisation in the cantons, and especially in the Canton Fribourg, requires a clear conceptual demarcation between basic types of equalisation. Therefore, this opening section will provide a brief explanation on three basic distinctive criteria and the resulting classification of fiscal equalisation policies.

Following the theory of public finance, local fiscal equalisation can principally take two directions depending on the number of government levels involved:³

Vertical fiscal equalisation implies that the communities concerned by fiscal equalisation are situated at different levels of government. In practice, at the

³ This distinction relies on the theory of David King who analyzed the applicability of equalization grants in the correction of vertical and horizontal fiscal imbalance. (King, 1984: 137 ff.).

decentralised levels, this means a set of transfers provided to communes by the next higher level of government (in the Swiss case this is the cantonal level).

Horizontal fiscal equalisation refers to the fiscal equalisation among communities situated at the same level of government. In terms of local fiscal equalisation this definition indicates a financial linkage among the communes themselves.

Another distinction of fiscal equalisation policies is often made upon the basis consisting of (1) the origin of resources that serve equalisation, (2) the nature of equalisation transfers, and (3) the criteria that determine the size of transfers.

Upon this complex basis we can differentiate between direct, indirect and mixed local fiscal equalisation.

Direct fiscal equalisation is effected when the mid-tier government, or in some cases the communes themselves, participate in the maintenance of a general equalisation fund. The fund is distributed⁴ on the basis of the fiscal capacity of communes and, optionally, by an additional set of criteria. Such grants are neither specific nor conditional, which means that they are not linked to any specific local public service.

Indirect fiscal equalisation is being pursued when the transfers provided by the mid-tier government to the constituent communes are assigned to well-defined local public tasks and at the same time are differentiated on the basis of the fiscal capacity of recipient communities. Accordingly, these transfers are specific conditional or specific block grants. The latter imply the advantage of stimulating the beneficiaries to make a more efficient use of the resources.⁵

Mixed fiscal equalisation refers to the combination of direct and indirect systems. It implies the simultaneous existence of a common equalisation fund and a set of specific equalisation grants provided to communes by the intermediate level of government.

The last terminological distinction relates to the budget constraint. Vertical indirect and vertical mixed fiscal equalisation may be financed either through open-end or closed-end grants.

⁴ Throughout the article, we use *distribution* and *allocation* as synonymous terms.

⁵ Conditional grants are generally expressed in percentage of the expenditure for the granted function, i. e. they are input-oriented. If a commune spends more on a particular granted function, it receives more in proportion. Block grants, on the other hand, are output-oriented: for a particular function, the commune will receive the grant if the previously set target is performed in a proper manner. If the commune can reach the target with lower expenditure, it will still receive the total contracted amount of the grant, which means that its own residual contribution will be smaller than projected.

Open-end grants are provided to the local community for the execution of a certain public responsibility, whereby the amount of the grant is unlimited by law. The commune can claim the specific subsidy as long as it meets the eligibility criteria, whatever the financial position of the canton.

Closed-end grants: contrary to open-end grants, the amount of a closed-end grant is kept between certain limits fixed by law.⁶ In cases where the aggregate demand for funding exceeds the available resources, one or more selection criteria need to be introduced.

Such classification may be done along a number of distinctive criteria that are different from the three mentioned above. From a policymaker's point of view this implies that fiscal equalisation may in principle be refined further by taking a growing number of criteria into consideration. The actual policy design depends on the combination of the selected categories. For the purposes of the present analysis, however, it is not necessary to introduce any further distinctive criteria.

It is important to see that decisions about the combination of the selected categories are not quite innocent. Some combinations might lead to situations that cannot be explained directly from the chosen categories. For instance, the choice of an **indirect and vertical** equalisation policy based on **closed-end grants** will bring about an outcome that is rather different from what might have been expected. Such a policy design implies that the disposable resources are not infinite. For any specific local public task, awarding a targeted cantonal subsidy to one commune will necessarily restrict the amount of funding for other communes. Local governments must compete with each other for the available resources that are severely limited by the donor (higher-level) government. With equal access to the granting system, the result of such mechanism is a revenue transfer from communes enjoying a strong financial position to less affluent communes. A horizontal fiscal equalisation scheme would obviously lead to similar results.

The Canton Fribourg in Switzerland is one typical case for the existence of such double-faceted policies. Formally, the local fiscal equalisation system of the Canton Fribourg can be characterised as follows:

- It is **vertical**, since the resources involved in the equalisation are exclusively provided by the cantonal level.
- It is **indirect**, since equalisation is effected through monetary transfers from cantonal authorities to local governments, and the use of such grants

⁶ The limit is "structural", which means that it is jointly discussed and decided by the canton and the communes while drafting the law. This limit, ultimately fixed by the law, cannot be modified in the annual budgetary process on grounds of the prevailing fiscal situation in the canton. This is often the case with revenue sharing where communes receive a fixed percentage of the total tax yield. In the Canton Fribourg, for example, the communes receive 30 % of the cantonal tax on vehicles.

by the recipients is linked to well-defined public functions. Currently there is no direct equalisation in the canton.

- It operates with **closed-end grants**, at least for a wide range of public functions.

Following the argumentation above, one cannot rest satisfied with the identification of the formal character of fiscal equalisation policy in the Canton Fribourg. The picture changes when considering the interaction between pure vertical equalisation and the predominant use of closed-end grants, insofar as the latter is likely to alter the actual direction of monetary streams. Therefore it is plausible to say that the fiscal equalisation system in the Canton Fribourg is **formally vertical but latent horizontal**.

This finding about the latent existence of horizontal equalisation might weaken the ongoing argumentation against the introduction of explicit horizontal measures. The cantons of Neuchâtel, Vaud and Berne have recently adopted direct horizontal equalisation systems by setting up in their respective jurisdictions common equalisation funds fed by regular contributions of the financially strong communes.⁷ In the Canton Fribourg, the formal introduction of horizontal equalisation has been on the agenda since the local equalisation reform of 1975. Yet, up to this date the legislative has not approved it, partly on the grounds that the severely fragmented municipal structure would be likely to pose an inequitable burden on large and rich communes.⁸ The argument goes that communes capable of organising their public services in an efficient and expedient manner and thereby capable of strengthening their own financial position, should not be forced to compensate for the inefficiencies of those localities that are reluctant to organise themselves. This logic is also underpinned by the fact that the organic law (the Act of 25 September 1980 on the communes) gives a free hand to local governments to decide about

⁷ (a) Neuchâtel: « Loi sur le péréquation financière intercommunale du 10 janvier 2000 » (RSN 171.16), in force since January 2001. (b) Vaud: « Loi sur les communes du 28 février 1956 » (R 1956, p.29). A new system of direct and horizontal equalisation has been introduced by referendum, May 21, 2000 within a larger reform package including a re-assignment of functions between the canton and the communes (in force since January 2001). (c) Bern: « Gesetz über den Finanz- und Lastenausgleich (FILAG) vom 27. November 2000 » (BELEX 631.1).

⁸ Among several other Swiss cantons, Fribourg also suffers from the excessive number of very small communes. Almost half of the communes in Fribourg count less than 400 inhabitants (Dafflon, 1998: 131). Nevertheless the question of mandatory amalgamations – the so-called "Nordic approach" (Coucin of Europe, 1995) – has been a taboo since 1974, the year in which a related proposal of the Cantonal Council was approved by the Cantonal Parliament but firmly rejected by some 60% of the voters in a subsequent referendum. Despite the strong aversion of the smallest communes, the number of voluntary amalgamations has spectacularly risen since 1974. In the period between 1866 and 1973, not more than 9 municipal mergers were effected within the Canton, concerning 19 communes (-10 in the period), against 25 amalgamations registered in the following 25 years (between 1974 and 1999), concerning 56 communes (-22 in the period, ending with 245 communes) (Dafflon, 1998: 126). The outstanding number of mergers in the years 2000 to 2003 (22 new agreements, concerning 77 communes, -52 in the three years' period) is largely due to a favourable change in 1999 in the regulation of the related financial incentives (Dafflon, 2000a). See also (Grand Conseil, 1999).

voluntary co-operation or amalgamation. The introduction of horizontal equalisation measures should therefore be preceded by a careful examination of whether the efficiency of local service provision could further be enhanced. This might also include the reorganisation of public responsibilities between the canton and the communes.⁹

The analysis of the selected combination of distinguishing criteria allows us to formulate three further conclusions:

- Due to the inherent diversity of formal transfer systems and their characteristics, equalisation programmes take such a wide variety that it is of absolute necessity
 - (i) to describe the various formal systems in an accurate manner;
 - (ii) to evaluate the actual (vertical and horizontal) incidence before starting to develop further equalisation programmes. Too often, new programmes are added to existing ones without the latter being carefully scrutinised and assessed with regard to the envisaged objectives.
- The re-examination and reform of the current equalisation system are likely to necessitate, as a precondition, the reassignment of functions and/or revenues – or, like in the Canton Fribourg, the reorganisation of the communal level, e.g. the amalgamation of communes. Equalisation is nothing more than a temporary remedy for fiscal disequilibrium: it cannot eradicate the malpractice that leads to instability.
- Indirect fiscal equalisation is likely to exacerbate the disparities among local communities. Under such a system the canton provides specific grants with two components: a basic rate that takes into account incentive or any other technical measures of allocation (based on costs, economies of scale, spill-over benefits etc.), and an additional equalising component that depends on the fiscal capacity of the commune. The recipient commune can therefore benefit from the cantonal equalisation policy only insofar as it has the capacity to finance the residual expenditure not covered by the grant. Although the equalising component enhances the total rate of the grant, communes with low fiscal capacity can seldom afford to provide the residual funding for the granted project, for which reason they are practically excluded from the equalisation benefits. It is a vicious circle.

⁹ When the draft law of 12 July 1991 on fiscal equalisation was discussed in the Cantonal Parliament of Fribourg, the ad-hoc committee proposed to return the draft law to the Cantonal Council with the argument that the executive should present a project for encouraging the amalgamation of communes before any discussion about direct equalisation, whether vertical or horizontal. See (Grand Conseil, 1992: 3).

3 The challenge of measuring local fiscal capacity

It is deemed to be obvious that the allocation of equalisation grants must follow a sound and well-designed pattern, otherwise the principles of equity and efficiency may be hurt. At the local level, allocation on the basis of fiscal capacity has proved to be by far the most feasible pattern up to this date.¹⁰ However, measuring the fiscal capacity of a commune may call for complicated formulas. In addition, it leads to serious clashes against certain basic principles of federalism such as jurisdictional autonomy and distribution equity. In fact, one of the particularities of fiscal equalisation is the special relation between ends and means. It is almost impossible to distinguish between these two, which means that defining the formula for measuring fiscal capacity will at the same time fix the objective (or the extent) of equalisation. In this section the reader will be confronted with some of the related problems that are rather typical to fiscal equalisation systems in federal or highly decentralised countries.

Following the methodological excursion in sub-section 3.1 concerning the measurement of fiscal capacity, sub-section 3.2 will discuss the problems related to the design of the global fiscal capacity formula. Finally, sub-section 3.3 will present how the measurement of fiscal capacity and the classification of communes can clash with the objectives of local equalisation policy.

3.1 The current method of measuring fiscal capacity

From a methodological point of view, the current system of local fiscal equalisation in the Canton Fribourg is based on the classification of communes according to their fiscal capacity. This classification serves as a starting point for calculating the available equalisation grants to be transferred to, and the required financial contributions to be paid by each commune. The size of the equalisation grant to be transferred to a given commune depends on its "rating", i.e. the class it belongs to. This mechanism relies on the assumption that the position of a commune in one class or another reflects its fiscal capacity.

¹⁰ Alternative solutions include the measurement of economic capacity and/or financial capacity. The first one necessitates the calculation of a "municipal net income" indicator, similar to the existing NIC (net income of the canton; for a methodology of calculation see the Statistical Yearbook of Switzerland, Federal Office of Statistics, Zürich 2001: 224), that would encompass the totality of incomes generated by all economic activities of the inhabitants and perhaps of those who carry on activities in the respective jurisdiction. Considering that local economies are highly open economies (Oates, 1972: 4), it is extremely difficult to develop such an indicator. Measuring financial capacity, which includes among others the revenues from rents and royalties on local government property, is more feasible. Yet several public economists reject this second alternative on the grounds that it does not clearly accentuate the resources of the local public sector within the total amount of national resources.

3.1.1 Measuring fiscal capacity

The current classification underlies the following three principles (Conseil d'État, 1989a):

- Efficacy* This principle allows for a more appropriate differentiation of aid, on the basis of a even spreading of communes across the different classes of fiscal capacity.
- Justice* The equalisation may not favour those communes that themselves do not take any measure to stabilise their financial position. The criteria applied to the classification must reflect in an equitable manner both the benefits and the inconveniences deriving from the geographic, historic or economic environment of any given commune.
- Clarity* The classification method must be verifiable for all stakeholders and be based on unambiguous statistics.

The first classification of communes that served the allocation of public resources between the Canton Fribourg and its communes, and implied a sort of vertical indirect fiscal equalisation, appeared in 1877 (Dafflon, 1981: 41). Since that time, the classification system has undergone five significant changes (in the years 1902, 1932, 1963, 1975 and 1990). From 1990, the calculation of the global index of fiscal capacity relies upon the following two indicators, often referred to as the "criteria" of measurement, A and B below (Département des communes, 1989).

A. Indicator of local fiscal resources

It is based on the average per-capita revenues of year t and the preceding year $t-1$, deriving from the cantonal taxes on personal income and wealth, as well as on corporate profits and capital within the commune, compared to the per-capita tax receipts calculated for the canton as a whole.

$$(1) \quad \text{Indicator of local fiscal resources (LFR}_i) = \frac{T_{cantonal(i)} / LP_i}{\sum_i T_{cantonal(i)} / \sum_i LP_i}$$

- where $T_{cantonal(i)}$ total receipts of cantonal taxes in the commune i
(average receipts of years t and $t-1$)
- $\sum T_{cantonal(i)}$ total receipts of cantonal taxes in the Canton Fribourg
(average receipts of years t and $t-1$)
- LP_i legal population of commune i in year t
- i subscript for the 206 communes at the time of calculation

The indicator of local fiscal resources is quantified in points. The cantonal average has a value of 100 points; the position of the individual commune is proportionally adjusted to this reference value.

Since this indicator is based not on the effectively collected tax revenues but rather on the *tax capacity* of the commune, here we are dealing with a kind of representative tax system (RTS) on the cantonal level.¹¹ Several Swiss cantons apply the RTS to estimate the tax capacity of their constituency.

B. Indicator of local financial needs

In addition to the local potential for obtaining fiscal resources, some cantons also consider expenditures or financial needs in a simultaneous formula. In the Canton Fribourg, local financial needs (or the costs of public services) are measured by a combination of three indices: population density, economic activity and demographic growth.

▪ *Population density index(PD)*

It is plausible to assume that the organisation of public services will pose a heavier financial burden on relatively dispersed communities, as well as on those that live under geographically unfavourable conditions. The unit cost of production of certain public services, characterised by growing economies of scale, is obviously lower in densely populated communes than in scattered communities. The lower the density of the population, the more accentuated the financial needs of the commune. A low population density leads to a decrease in the index value and, consequently, to a rise in the available equalisation grants.

$$(2) \quad \text{Population density index (PD)}_i = \frac{\sqrt[3]{RP_i / A_i}}{\sqrt[3]{\sum_i RP_i / \sum_i A_i}} \times 100$$

where A_i geographical area of commune i
 RP_i resident population of commune i in year t

▪ *Economic activity index(EA)*

Communes assuming the role of a regional centre are induced to deliver some specific public services linked to the general economic activity. Operating with the *inverse* rate of activity (or employment) in the formula reflects the fact that the fiscal burden tends to grow disproportionately in communes charged with district-level or regional public responsibilities. Thus, the higher the rate of activity in any commune i , the lower its index EA_i . The rate of activity (employment) establishes a relationship between the number of working places and the total size of population in any given community. Thereby it allows distinguishing between communes that assume the role of a regional centre and those that have a predominantly residential character or those that for any other reason show a less intensive economic activity.

¹¹ For a definition of the RTS, see (Cordes, Ebel and Gravelle, 1999: 360 ff.) The system is also applied in Canada (Bird and Slacke, 1990) and in France (Gilbert, 1997).

$$(3) \quad \text{Economic activity index (EA}_i) = \frac{\sqrt[3]{\frac{\sum_i L_i}{\sum_i LP_i}}}{\sqrt[3]{L_i/LP_i}}$$

where L_i number of full-time working places in commune i
 LP_i legal population of commune i in year t

▪ *Demographic growth index(DG)*

The third index reflects the fact that communes registering a substantial growth of their population in comparison to the cantonal average tend to perceive an increase in their financial needs.

$$(4) \quad DG_i = 100 - \frac{\left[\frac{LP_i^{(t)} - LP_i^{(t-10)}}{LP_i^{(t)}} \times 100 \right] - \left[\frac{\sum_i LP_i^{(t)} - \sum_i LP_i^{(t-10)}}{\sum_i LP_i^{(t-10)}} \times 100 \right]}{2}$$

where $LP_i^{(t)}$ legal population of commune i in year t
 $LP_i^{(t-10)}$ legal population of commune i in year $t-10$ (ten years before).

The DG index value takes into account half of the difference between the actual demographic growth in a commune for the last ten years and the average demographic growth in the canton for the same period. The inversion of the difference in the numerator means that if a commune has a rate of population growth higher than average, then the index value decreases below 100 points by half of the difference. This lowers the total index, which ensures a higher amount of grant for that particular commune.

The actual value of each of the three indices above is expressed in points. The indicator of local financial needs is calculated as the simple arithmetic average of the three index values:

$$(5) \quad \text{Indicator of local financial needs (LFN}_i) = \frac{PD_i + EA_i + DG_i}{3}$$

where PD_i indicator of population density in commune i
 EA_i indicator of economic activity in commune i
 DG_i indicator of demographic growth in commune i

C. An abandoned indicator

Until 1989, the global index of local fiscal capacity included a third indicator, which served to measure **local fiscal effort**. The underlying argument was the recognition that it is not justifiable to provide grants to those communes that do not make the slightest effort to raise funds and participate in the financing of their public services. However, the criterion of fiscal effort clashed with the fundamental principle of local fiscal autonomy and proved to be counterproductive with regard to cost savings. Furthermore it has led to severe discriminatory effects as well as to abusive behaviour at a number of local governments (Conseil d'État, 1989a and Dafflon, 1981: 110-112).

D. The global index

In the current system, each of the two indicators – the indicator of local fiscal resources and the indicator of local financial needs – allows a ranking of the communes, whereby the cantonal average is valued at 100 points, and the indicator values of each commune are calculated with reference to this average. In any commune, the global index of fiscal capacity corresponds to the weighted average of the scores obtained by the partial classifications. A weight of 2/3 is given to the indicator of local fiscal resources, while the indicator of local financial needs weighs 1/3 in the global index value.

$$(6) \quad \text{Global index of fiscal capacity (E}_i) = \frac{2}{3} \times \text{LFR}_i + \frac{1}{3} \times \text{LFN}_i$$

where LFR_i indicator of local fiscal resources in commune i
 LFN_i indicator of local financial needs in commune i

3.1.2 **The classification of communes**

Finally, the communes are divided into six classes according to the respective value of their global fiscal capacity index. This is particular to the equalisation system in the Canton Fribourg.¹² The division occurs upon the following principles:¹³

- i. Communes with the strongest fiscal capacity (highest global index value) are attributed to class 1; class 6 contains the communes with the weakest fiscal capacity.
- ii. The burdens and the benefits of the equalisation policy must be allocated among the communes in such a way that no class is left out of consideration.
- iii. An equal number of classes must be reserved for communes with an index value superior to the cantonal average, on the one hand, and for communes whose index value is below the cantonal average, on the other

¹² Most cantons directly use the index of fiscal capacity for calculating the amount of equalisation grant for each commune. Using the index for a classification of the communes in six classes, then using the classes to fix the amount of grant is peculiar to the Canton Fribourg.

¹³ See (Conseil d'État, 1989a and 1989b). This decree has laid down the fundamentals of the current classification method.

hand. This implies that the separation line between rich and poor communes (corresponding to the average index value of 100 points) is drawn between class 3 and class 4.

- iv. The concentration of the majority of communes in one single class must be avoided.

In order to ensure a more or less balanced probability of the distribution of communes across the six classes, the method of moving averages is applied (see Annex 1). The procedure is the following. The primary distribution of communes into two major groups is effectuated by comparing local index values to the cantonal average (100 points), as the third principle above suggests. In the second step the average index values for these two groups are calculated, so that the upper limit of class 3 and the lower limit of class 4 can be drawn. These two thresholds determine the range of communes constituting the classes 3 and 4. The calculation of the average index values for the rest of the communes leads to the threshold values separating class 2 from class 1, on the one hand, and classes 5 from class 6, on the other hand. However, this procedure implies beforehand that each commune has a higher probability to fall into classes 3 and 4 than into any other classes.¹⁴ This would clash with the fourth principle mentioned above which calls upon avoiding the concentration of communes in one class or another. In order to correct the bias and ensure an *a priori* identical probability for all six classes, the threshold values separating class 3 from class 2 on the one hand, and class 4 from class 5 on the other hand, are calculated on the basis of an adjusted formula:

Upper limit of class 3 (threshold to class 2) = $100 + 2/3 \times C_{1,2,3}$

Lower limit of class 4 (threshold to class 5) = $100 - 2/3 \times (C_{4,5,6} - 100)$

where

$E_{1,2,3}$: the average of the communal fiscal capacity index values in classes 1, 2 and 3;

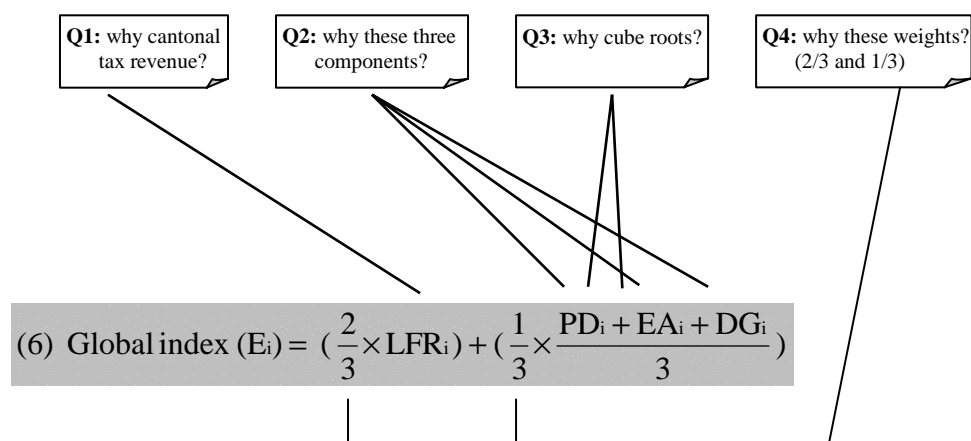
$E_{4,5,6}$: the average of the communal fiscal capacity index values in classes 4, 5 and 6.

This correction has been applied since 1979 (Conseil d'État, 1978 and Dafflon, 1981: 110-112).

¹⁴ At each step of the partition procedure, the probability for a commune to fall in one class or another is $1/4$. The final probability value results from the multiplication of partial probability values obtained at each step of the procedure. Therefore it is obvious that the probability (25.0 %) of falling into classes 3 or 4 is higher than the probability of falling into classes 1, 2, 5 or 6 (12.5 %). The system is thus biased in favour of classes 3 and 4, although it is *a priori* recognised that the distribution probability should be $100/6 = 16.66$ % for each of the six classes (Dafflon, 1981: 110-112).

3.2 Four remarks on the design of the global fiscal capacity index

With regard to the design of the global fiscal capacity index, at least four questions must be raised. Through resuming formula (6) in a more detailed form we first provide an overview of these questions.



Question 1

Beside the partial tax sovereignty that implies a free choice between ability-to-pay taxes and user charges, communes in Switzerland do not enjoy but a certain degree of tax flexibility. This means that communes are tied to the tax system of their canton: they are not entitled to define the taxes to be raised, nor to alter the cantonal tax scheme. However, they can decide on the annual coefficient of taxation as a percentage of the canton's taxes, which resembles a piggy-back tax.¹⁵

The formula of local fiscal resources does not contain the communal coefficient as a variable. To be more accurate, the formula automatically reckons with a tax coefficient of 1.0, as if every local government levied local taxes corresponding in size to 100 % of the canton's taxes. The underlying reason for this methodological simplification is that no other way has been found to avoid the distortion that could possibly derive from the existing tax competition between the communes. If local coefficients were taken into consideration, then the equalisation policy would favour the communes applying lower coefficients with apparently low tax yield against those that have opted for higher coefficients. Given the current "race to the bottom" of local tax rates in Switzerland, in the statistics too many communes would appear to have a low capacity, which would raise the overall demand for

¹⁵ The general formula of tax revenue is the following (Dafflon, 2000b: 269ff):

$$T = t \times [B - (D_1, D_2, D_3, \dots, D_i, \dots, D_n)] \times (K_{\text{Fed}} + K_{\text{canton}} + K_{\text{commune}})$$

where T revenue from a tax; "t" the tax rate schedule; B gross tax base; D possible deductions from the tax base and K annual coefficient aiming at a balanced (current ?) budget. Tax flexibility means that a local government can at least decide on the tax coefficient K_{commune} but has no influence on the rest of the formula or the kinds of tax to be raised. This is typically what the international literature calls piggy-back taxes.

equalisation transfers. In fact, a great number of communes tend to decrease the share of direct tax revenues in the local budget by reducing their tax coefficient, and simultaneously they introduce user charges to make up for the lost tax revenue. Since user charges do not appear in the formula of local fiscal resources, communes refraining from this source of revenue would suffer a negative discrimination by the allocation of equalisation grants. Therefore, starting out from a communal tax level generalised at 100 % of the cantonal taxes helps to ensure the neutrality and the comparability of fiscal resources among the communes.

A more important question might be raised in relation to the representative tax system that is applied here (see section 3.1.1). The tax capacity in any RTS is estimated upon the basis of a limited range of taxes. The choice of taxes cannot be but arbitrary, even though it may rely on sound economic arguments. The key question is whether the selection of taxes featuring in the RTS of the Canton Fribourg is appropriate or not. Other taxes could just as well have been added to the system, yet another could have been eliminated from it. It is deemed to be obvious that taxes yielding regular revenue (e.g., tax on immovable property) perform better in the RTS than taxes with irregular receipts (e.g., tax on capital benefit).

Question 2

Several cantons have included a needs indicator into their global formula of fiscal capacity. The choice of the “ingredients” of such a needs indicator relies heavily on the actual definition of communal needs and public service costs. Nevertheless, it can also be the result of careful deliberation and lengthy negotiations and finally reflect the political and financial interests of those communes that sit close enough to the “meat pot”, i.e. those which are the most capable of influencing the decision-making process that leads to the actual allocation pattern.

In the Canton Fribourg, the result of such negotiations is a set of partial indices which, however, cross-cut each other. Considering the eligibility of communes for equalisation aid and the amount of available funds, the population density index clearly favours the scarcely populated communes against densely populated ones. However, as the argument goes, densely populated communes are more involved in regional economic activities whose spill-over effects may in some cases be substantial. In order to offset this imbalance and take account of the increased public responsibilities of densely populated communities, an economic activity indicator has also been taken up into the formula. Indeed, industrial towns and cities tend to have a higher rate of activity than communes heavily relying on agriculture or tourism. Since agriculture, tourism and industry obviously complement each other within certain geographic boundaries and all these activities contribute to the sound economic development of a region, it is not expedient to favour any of them to the detriment of the other sectors.

Thus the economic activity indicator favours the densely populated but economically active communes against the scarcely populated ones and, by doing so it moderates the effect of the population density indicator. There is, however, a third group of communes that do not meet any of these two eligibility criteria. These are communes with a growing population but a low rate of economic activity, situated mainly in the agglomeration of large cities. These communes, too, must be able to meet some basic needs of their inhabitants (like road infrastructure, primary education and basic health services), while their revenue resources are fairly low, due to the scarce economic activity in their jurisdiction. To accommodate the interests of this group, the demographic growth index has been added to the formula. According to the formal argumentation, this third index is supposed to compensate for the imbalances caused by the first two indices.

The reasoning behind each of the three indices may be correct in itself. Nevertheless, when it comes to calculating their average to figure out the actual value of the financial needs indicator for each commune, the scores fall into a fairly short interval due to the multiple balancing mechanisms built into the formula. This cross-cutting obviously weakens, if not annihilates, the justification of using an indicator of financial needs in the global fiscal capacity formula.

Question 3

The fact that two components of the financial needs indicator (the population density index and the economic activity index) contain *cube root* variables, might suggest to an outsider that the calculation method rests on a solid econometric foundation. There is indeed an official argument which says that taking the cube root of the concerning variables is essential for bringing down the indicator values to a level where they are easy to handle in an arithmetic sense. Indeed, values around 100-150 points can easily be integrated into the global fiscal capacity index, whereas their multiples would certainly distort the final calculation. However, we have not found any palpable argument for the choice of this particular root factor. If it is purely about the diminution of the index values, then the square root, the fourth root or the fifth root could do the job just as properly as the cube root. Nevertheless, the democratic process of decision-making dictated a different logic in this case, whereby political interests have proved to be dominant over economic considerations. Therefore the currently applied method is an outcome of sheer bargaining and strategic manoeuvres by between the decision-makers, and it is simply based on the expected financial results.

Question 4

A similarly pseudo-scientific approach can be detected in the method of weighting the variables. As section 3.1.1 has shown, the global index of fiscal capacity for any commune is calculated as the weighted average of the scores obtained by the two partial classifications. The indicator of local financial needs is assigned a weight of 1/3, while the indicator of local fiscal resources

counts with a weight of $2/3$ within the global index value. According to the official argument, the *choice of weights* reflects the idea that the calculation of the fiscal resources indicator is expected to bring a relatively accurate result, whereas the proper quantification of local financial needs is much more difficult, if not straight away impossible. Nevertheless, the reasoning that underlies this particular weight distribution is fairly questionable. Instead of the ratio of $1/3$ to $2/3$, various other ratios could just as well have been chosen. The truth is that, again, the decision about these particular weights is an outcome of a lengthy political debate whereby some influential members of the decision-making committee have managed to carry their point in favour of the communes they were representing.

3.3 Major concerns related to the capacity-based classification of communes

With regard to the capacity-based classification of communes, there are two relevant points to be discussed in the case of canton Fribourg. Section 3.3.1 deals with the key question whether it is adequate and efficient to have needs (costs) equalisation linked with revenue equalisation in a single fiscal capacity formula. Section 3.3.2 will provide a brief critical analysis of the current classification schedule.

3.3.1 Linking needs equalisation with revenue equalisation

As a starting point in the discussion we can suppose that any local government is spurred by its electorate to provide local residents with a range of public services. The volume of provided services depends on both the expenditure needs and the financial resources of the local community. Both the needs and the available resources depend heavily on geographic, demographic, socio-economic and other factors. Local needs are further determined by legal regulations concerning the group of mandatory public goods that local government must provide by all means, and they also vary according to the particular preferences of the local residents. The difference in needs and resources between localities is frequently referred to as *local fiscal disparity*.

Local fiscal equalisation, within a federal (or at least strongly decentralised) system of government, refers to attempts made at the reduction of fiscal disparities among communes by monetary transfers. According to the common-sense definition, fiscal disparity at the communal level can be a variation (1) in the revenue-raising capacity of the communes, (2) in the unit cost of public services or (3) in the local choices for certain preferred local public services. Each local fiscal equalisation measure can thus result in either *resource equalisation* or *cost (or needs) equalisation*, respectively, while disparities in local choices usually stay outside the scope of equalisation, as will be explained later. Cost (needs) equalisation should principally be a vertical equalisation, while resource equalisation can also be effectuated on the horizontal level.

With regard to needs equalisation, it is important to point out that the needs equalisation policy does not necessarily have to address the totality of local expenditure needs. As denoted above, any local government must provide by law a specific group of public goods in order to reach a minimum service level prescribed by the federal state or the canton. Whatever the volume of locally available resources, the unit costs of producing these goods up to the minimum level may vary from one community to another, due to geographic, demographic, socio-economic factors, population size and many other variables. Since the decisions concerning the provision of this minimum level are beyond the control of the communes, differences in the production costs must in principle be fully compensated by that level of government which expects the commune to provide the given public service (procurer pay principle). Production cost differentials may be compensated (in other words, vertical needs equalisation can be done) with specific grants linked to the standard costs of the service.¹⁶

On the other hand, local governments in a federal system are normally free to produce any additional public goods and services beyond the legally defined minimum level, as well as to exceed cantonal or federal quality norms in the execution of the prescribed public tasks. Fiscal disparities deriving from the budgetary autonomy of communes need not necessarily be handled by the canton. Local fiscal equalisation can (and should) be restricted to the repression of fiscal disparities down to the limit where the provision of the required minimum level of local services is ensured.

In the case of Fribourg, a grievous concern has lately emerged in this respect. It has been recognised that differences in the unit costs of public services across communes are not adequately taken into account by the allocation of cantonal equalisation funds. The classification of communes occurs upon the basis of the global fiscal capacity index described above, in which the needs component fails to include an indicator of cost differences. While it is generally acknowledged that constructing one kilometre of a motorway of a certain quality is more expensive on a mountainous area than it is on a plain area, the current formula takes no account of the difference in unit costs. The needs criterion is measured solely by counterbalancing the indices of population density, economic activity and demographic growth, which obviously cannot make up for the lack of a cost differential measure. In fact, measuring local differences in unit costs is not uncomplicated. Yet a system of norms could eventually be set up to establish a link between the cost influencing factors and the acceptable cost levels.

¹⁶ Such equalisation, however, may lose legitimacy in certain cases. When the excessive costs of public services and the failure to realise economies of scale result from the extremely large number of small communes, the possibility of the reorganisation of public responsibilities through inter-communal co-operation and amalgamation should first be considered. (See also: footnote 7).

3.3.2 The classification schedule

With regard to the capacity-based classification of communes in the Canton of Fribourg, another worry of policy-makers is the roughness of the classification schedule. The actual system operates with weights developed from the *inverse class* of each commune. Inverse class is defined as the hypothetical class number that a commune would be assigned if the series of class numbers followed in reverse order. Thus, for communes situated in class 6 the inverse class is 1, for communes in class 5 it is 2, for those in class 4 it is 3 etc. Obviously, this series of inverse classes is the outcome of a methodological choice which corresponds to the current practice. It is important to see that several other reverse scales are conceivable, e.g., one that extends from 7 to 2:

Class	1	2	3	4	5	6
Weight	6	5	4	3	2	1
Other possible weight series	7	6	5	4	3	2
	8	7	6	5	4	3
	...					

The relative weights in the actual classification (from 6 to 1) imply that the multiplier of the number of inhabitants in a commune in class 1 will be six times as large as the multiplier of applied to a commune in class 6. If a commune jumps from class 6 to class 5, the weight applied in the formula will double (from 1 to 2). With a series of inverse weights ranging from 7 to 2 or from 8 to 3, the same jump would result in a 1.5 fold or 1.25 fold increase of the applicable weight, respectively. Again, the choice of a particular series of inverse weights associated with the classification is not an "innocent" technical choice; the way to such result is paved with the political intention of influencing the equalisation outcome.

In the actual system of weights ranging from 6 to 1, communes jumping one class higher on the scale due to a growth in their global fiscal capacity from the previous period (thus moving from class 2 to 1, or from class 5 to 4 etc.) face a significant rise in their financial contribution to the cantonal equalisation measures. On the other hand, communes descending by one class (that is towards class 6) will benefit from a sharp rise of the grant amount. A consequence of this phenomenon is that the system is naturally susceptible to be blocked. Especially the communes situated at the upper extreme of a class interval are interested in preserving their position in the same class as long as possible.

In search for a remedy to this problem, in the spring of 2000 the Cantonal Council gave a mandate to an expert team to explore the potential effects of changing the range of classes into a continual scale (Conseil d'État, 2000a). In this new system, each commune would be represented by the actual value of its global index of fiscal capacity. A simulation was carried out, with a focus on seven domains of equalisation including primary education. Results showed that, on the whole, applying a continuous scale would enhance the per-capita

burden of equalisation in the poorest communes (classes 6 and 5), while it would alleviate the charge on those who live in rich communes (classes 2 and 3). As a consequence, the inter-communal solidarity – a basic objective of equalisation – would be partly dismantled.

However, the quest for an optimum solution has not yet been concluded. As a matter of fact, in some recent laws the canton of Fribourg has started to employ the global indices of fiscal capacity rather than the classification schedule derived from them.¹⁷ Very little attention has been paid to this fact so far, although it marks a major milestone in the development of the transfer system. Another sign of this trend away from classification and towards the use of a continuous scale is a recent research project initiated by the canton itself. At the end of 2002, the Chair for Public Finance at the University of Fribourg received a mandate from the Cantonal Council to analyse the distributional incidences generated by the current system of fiscal equalisation transfers in the canton. On the medium term, based on the results of this analysis, the council will possibly decide to explore the potential for a policy review. Section 4 of this article provides some insight to the start-up phase of the university research project.

4 The distributional incidences of fiscal equalisation in the Canton Fribourg

The execution of the cantonal mandate mentioned in section 3.3.2 relies on a working plan which envisages splitting the analysis of the distributional incidences of equalisation grants in the Canton Fribourg into four phases:

- | | |
|---------|---|
| Phase 1 | Simulation of the incidences resulting from the distribution of a hypothetical amount of one million Swiss francs from the cantonal budget to the 206 constituent communes with various formulas applied in the present system. |
| Phase 2 | Identification of cantonal grant programmes and corresponding monetary flows that contain one or more equalising components. |
| Phase 3 | Revision of the equalisation formulas currently applied in the Canton Fribourg. |
| Phase 4 | Application of the simulation (Phase 1) to the newly developed formulas. Analysis of the volume and quality of equalisation. |

This section presents the methodology and the results of a preliminary work that paves the way to Phase 1 of the mandate.

¹⁷ See (a) Law of the Canton Fribourg of October 8, 1992, on the implementation of the federal legislation concerning the support for victims of infringements; (b) Decree of the Canton Fribourg of November 11, 1998, on the encouragement of amalgamations between communes; (c) Law of the Canton Fribourg of November 26, 1998, amending the law of November 14, 1991, on social aid; (d) Law of the Canton Fribourg of March 23, 2000, on the medical-social establishments for aged persons.

4.1 Methodology

The vertical and indirect fiscal equalisation policy, in the form as it is realised in the Canton Fribourg, implies that equalisation resources are transferred from the canton to the communes through a range of specific grant programmes¹⁸ in which the distribution formula regularly contains one or more equalising components. Currently there are more than twenty grant programmes with an equalising component in the Canton Fribourg. In Phase 1 of the mandate and, accordingly, in the preparatory simulation to be presented here, we have chosen not to start immediately with the individual analysis of these grant programmes. At the start-up, the emphasis is rather laid on the incidences generated by different patterns of distribution. Therefore we have allocated a hypothetical amount of one million Swiss francs from the cantonal budget to the 206 constituent communes on the basis of four different distribution scenarios. The simulation relies on a database containing relevant statistics on each of the 206 communes.

Annex 2 shows a fragment of our simulation worksheet. Instead of demonstrating the individual records of each of the 206 communes registered in the Canton Fribourg, we have limited ourselves to the presentation of the table headlines, the respective data series for one selected commune (Arconciel), as well as the cantonal aggregates (where applicable).¹⁹ The reason for including this worksheet sample in the Annexes is to demonstrate the procedure by which (i) the global index of fiscal capacity, (ii) the amount of transfer receipts in S_1 , S_2 , and S_3 , and (iii) the divergence of these amounts from the receipts defined for S_0 have been calculated for each commune.

The worksheet is structured as follows: input data are given in columns 1 to 11, while columns 12 to 21 contain the index values as generated by equations 1 to 6 (section 3.1.1). Finally, columns 21 to 35 show the results of the incidence simulation according to the four scenarios to be presented in section 4.2.

Input data

The range of input data is identical to the standard database that the Department of Communes of the Canton Fribourg uses in order to classify the communes at regular stated intervals. It includes the following parameters (Annex 2):

column 1	Federal identification number of commune i
column 2	Name of commune i
column 3	Legal population of commune i as of December 31, 2000
column 4	Resident population of commune i as of December 31, 2000
column 5	Legal population of commune i as of December 31, 1990
column 6	Area of commune i in km ²
column 7	Number of full-time employed in commune i

¹⁸ For the definition of specific grants, see section 2.

¹⁹ Readers interested in the detailed statistics of individual communes are kindly requested to contact the authors at the address given on the front page of this article.

column 8	Tax receipts of commune i in 1999 in Swiss francs, where tax receipts in period $t =$ (cantonal taxes on the revenue and fortune of individuals received by commune i in period t) + (cantonal taxes on the profit and capital of legal persons received by commune i in period t)
column 9	Tax receipts of commune i in 1998
column 10	Average tax receipts in the commune i in 1999 and 1998: columns [8]+[9] : 2
column 11	Per-capita average tax receipts in the commune i 1998-1999: column [10] : 3.

Calculated indices

Upon the basis of the input data, the component indices of fiscal capacity and the global index are calculated for each commune. These are the index values that the Canton Fribourg considers as valid for the year 2001/2002. The steps of the calculation can be followed across columns 12 to 21 (all parameters apply to commune i):

column 12	Indicator of local fiscal resources: column [11] x 100 divided by the average cantonal tax receipts, 2422,59 francs, (see section 3.1.1, equation 1)
column 13	Population density: columns [4] : [6]
column 14	Population density index (section 3.1.1, equation 2)
column 15	Rate of economic activity: columns [7] : [3]
column 16	Economic activity index (section 3.1.1, equation 3)
column 17	Rate of demographic growth: columns ([3] : [5] - 1) x 100
column 18	Demographic growth index (section 3.1.1, equation 4)
column 19	Indicator of local financial needs: columns ([14]+[16]+[18]) : 3 (section 3.1.1, equation 5)
column 20	Global index of local fiscal capacity: columns (2x [12] + [19]) : 3 (section 3.1.1, equation 6)
column 21	Class assigned to commune i on the basis of its global index value (see section 3.1.2).

4.2 Scenarios

The last block of the worksheet (column 22 to 35) displays the procedure and the results of the distribution of one million Swiss francs across the communes on the basis of four different scenarios. Scenario 0 serves as a reference, with a distribution model based on the number of inhabitants in each commune. Scenario 1 employs the actual values of the global index of fiscal capacity (E_i). Scenario 2 relies on the division of communes in 6 classes, while scenario 3 applies the same method with 12 classes.

Starting out from what has been said in section 3 about the mutual influence between the objectives and procedures of equalisation, the present analysis will attempt to show how this interaction manifests itself in practice.

4.2.1 Scenario 0: Distribution based on the legal population of 2000

The initial scenario (S_0) operates with a simple linear (causal) distribution pattern. The allocation of the grants follows the statistical distribution of inhabitants across the communes. Accordingly, the amount of the grant allocated to each commune is proportional to the size of the locally registered

population (the legal population as of december 31, 2000; column 3 in Annex 2) in the concerning commune. The distribution formula is the following:

$$(7) \quad \text{Total transfer to commune } i \text{ in } S_0 = \frac{LP_i}{\sum_i LP_i} \times 1'000'000$$

Relevant columns of the simulation worksheet in Annex 2:

- column 22 communal quota for commune i , with a value between 0 and 1 (see fraction in equation 7)
 column 23 amount of transfer to commune i (equation 7).

We define S_0 as the basic scenario in the sense that it serves as a basis for comparison in the three alternative scenarios presented below. If grants are distributed in function of the population size, this will evidently not contribute to the alleviation of fiscal disparities between the communes. Consequently, in per-capita terms, the size of the transfer will be the same for all communes, irrespective of their fiscal capacity. By contrast, the alternative scenarios all take notice of the differences in local fiscal capacity.

4.2.2 Scenario 1: Distribution based on the index value continuum

This approach (S_1) neglects the current practice of classification and replaces the assignment to individual classes with the actual value of the global fiscal capacity index for each commune. This creates a nearly continual scale where the number of steps equals the actual number of different index values. Similarly to S_0 , the distribution key in S_1 is again a fraction:

$$(8) \quad \text{Total transfer to commune } i \text{ in } S_1 = \frac{H_i \times \frac{100}{E_i}}{\sum_i \left(H_i \times \frac{100}{E_i} \right)} \times 1'000'000$$

where H_i legal population of commune i
 E_i value of the global index of fiscal capacity in commune i

This scenario appears in the simulation worksheet as follows:

- column 24 communal quota for commune i (see fraction in equation 8)
 column 25 amount of transfer to commune i (equation 8)
 column 26 difference in the amount received by commune i in S_1 , compared to S_0 .

The inverse value of the global index in formula (8) indicates the negative correlation between the fiscal capacity of a commune and the amount of equalisation transfer for which it is eligible.

The distribution of grants on the basis of a continuous scale of index values boasts the advantage of smoothing the differences between the individual grant allocations. This benefit is especially appreciated by communes that would presumably be situated near a threshold value (marking the limit between two classes) if the equalisation system were based on classification. Such communes face the risk of a dramatic change in their fiscal position whenever higher-level authorities decide to reclassify the communes (section 3.3.2). Scenario 1 automatically eliminates any abrupt change of this kind. It is therefore logical to illustrate the continual distribution model with a curve rather than a step diagram.

4.2.3 Scenario 2: Distribution based on six classes of communes

Compared to S_1 , this approach (S_2) provides for a very simplified allocation of the available equalisation resources. S_2 is the pattern currently used in the Canton of Fribourg (section 3.1.2). As has been explained in section 3.3.2, the system suffers from the roughness of the classification schedule.

In contrast to S_1 where the reciprocal of the global index of fiscal capacity ($1/E_i$) is featuring in the nominator of the distribution formula, S_2 operates with weights developed from the *inverse class* of each commune:

class	1	2	3	4	5	6
weight	6	5	4	3	2	1

As has been shown in section 3.3.2, the inverse class series chosen by the Canton of Fribourg (from 6 to 1) creates a sixfold distance between communes in class 1 and those in class 6 when it comes to the calculation of the multiplier that is applied to the number of inhabitants. It has also been noted that the weight applied to the formula will double if a commune jumps from class 6 to class 5. The inverse class series enters the formula in the following way:

$$(9) \quad \text{Total transfer to commune } i \text{ in } S_2 = \frac{H_i}{C_{i(\text{inv } S_2)}} \times 1'000'000$$

$$\sum_i \left(\frac{H_i}{C_{i(\text{inv } S_2)}} \right)$$

where H_i legal population of commune i
 $C_{i(\text{inv } S_2)}$ the weight assigned to commune i

The respective columns of the simulation worksheet are the following:

column 27 weight (inverse class) assigned to commune i
column 28 communal quota for commune i (see fraction in equation 9)
column 29 amount of transfer to commune i (equation 9)
column 30 difference in the amount received by commune i in S_2 , compared to S_0 .

4.2.4 Scenario 3 – Distribution based on twelve classes of communes

Similarly to scenario 2, this pattern relies on the classification of communes but the number of classes has been extended from six to twelve.²⁰ This system smoothens, at least to a certain extent, the differences in the grant receipts of individual communes, since it allows a higher degree of differentiation between communes on the basis of their fiscal capacity. However, this smoothness is still very far from the situation resulting from S_1 where class thresholds were simply eliminated.

As in S_2 , here we calculate again with the inverse classes. Evidently, this time the series of inverse classes extends from 12 to 1. The distribution is based on the following formula:

$$(10) \quad \text{Total transfer to commune } i \text{ in } S_3 = \frac{H_i}{C_{i(\text{inv } S_3)}} \times 1'000'000$$

$$\sum_i \left(\frac{H_i}{C_{i(\text{inv } S_3)}} \right)$$

where H_i legal population of commune i
 $C_{i(\text{inv } S_3)}$ the inverse class assigned to commune i in S_3 .

Columns 31 to 35 of the worksheet demonstrate the calculation process as follows:

column 31	class assigned to commune i in a 12-class system
column 32	weight (inverse class) assigned to commune i
column 33	communal quota for commune i (see fraction in equation 10)
column 34	amount of transfer to commune i (equation 10)
column 35	difference in the amount received by commune i in S_3 , compared to S_0 .

4.3 Findings

4.3.1 Aggregate results

Columns 26, 30 and 35 in Annex 2 show the incidences of each distribution pattern: they indicate how the net financial position of each commune will change as a result of the alternative distribution practices S_1 (fiscal capacity index values), S_2 (six classes) and S_3 (twelve classes) respectively, compared to the starting position marked in scenario S_0 where the sum of one million Swiss francs was distributed among the communes in linear function of their population size. A negative figure in any of the columns 26, 30 or 35 indicates that the net fiscal position of the respective commune would deteriorate if the system of linear distribution were changed into the particular system

²⁰ By doing this, we followed the same principles as the Cantonal Council did when it defined the thresholds for the six-class system. Our aim was to ensure that for any commune, the probability of falling into any of the twelve classes be equal. The theoretical probabilities of distribution as well as the threshold values for both the six-class and the twelve-class systems are demonstrated in Annex 1.

corresponding to the column. Likewise, positive figures indicate an improvement. From the magnitude of the difference in the total transfer amount we can draw a direct conclusion with regard to the degree of deterioration or improvement. Nevertheless, comparisons of incidence at the level of individual communes can only be made on the basis of per-capita outcomes. These will be shown later on. The distributional incidences are evaluated based upon three aspects summarized in the box below: (1) the number of beneficiary communes (scope of equalisation); (2) the volume of effective equalisation, and (3) the relative gains and losses of individual communes.

Evaluation of the distributional incidences

Aspect of evaluation \ Scenario	S ₁	S ₂	S ₃	
(1) Scope of equalisation	Number of net receivers	170	126	126
	Number of net contributors	36	80	80
	Total	206	206	206
(2) Volume of effective equalisation = Total revenue surplus flowing to net receiver communes, in Swiss francs	94'422	238'781	268'433	
(3) Relative gains and losses of individual communes	Communes in favour of S _n	79.5*	70.5*	56
	Population concerned	156'834	50'031	28'893
	in % of total population	66.5 %	21.2 %	12.3 %

* As the commune of Ferpicloz would lose 440 Swiss francs both in S₁ and S₂, its one vote has been shared between the two scenarios. Accordingly, the numbers of communes voting against these scenarios are reduced by 0.5 each.

(1) Evaluation in terms of the scope of equalisation

If the distribution formula is based on the actual E_i index values (as in S₁), then 170 communes out of the 206 can register an improvement in their fiscal position (they are net receivers), while the remaining 36 must give up a part of their grant receipts in favour of the communes with the weakest fiscal capacity.

Should the classification method be applied (S₂ or S₃), in that case there are 126 net receivers against 80 net contributors. This rate is obviously identical for both the six-class and the twelve-class scales, in accordance with principle (iii) in section 3.1.2 which implies that the amount of contributions paid by the communes in the upper half of the scale must be equal to the amount of transfers to received by the communes in the lower half of the scale.

Regarding thus the scope of equalisation (the number of net receiver, or beneficiary communes), the distribution of transfers on the basis of the index value continuum (S₁) ranks better than any of the alternative patterns (patterns based on classification) in comparison to S₀.

(2) Evaluation in terms of the volume of effective equalisation:

The volume of effective equalisation is measured by the amount of revenue surplus received by the entire group of beneficiary communes under the respective distribution patterns. Thus, in each scenario, these sums represent the respective aggregate volumes of revenue allocation, allowing us to judge how much revenue may be mobilised for the purposes of equalisation. Viewed under this perspective, S_3 would perform better than the alternative scenarios. The aggregate revenue surplus of 268'433 Swiss francs against the total amount distributed among the communes (one million) means that of each Swiss franc transferred to the communes, almost 27 cents effectively serve equalisation purposes.

(3) Evaluation in terms of relative gains and losses of individual communes

Assuming that voters in any given commune behave rationally, every voter will seek to maximise the benefits or minimise the losses of his commune of residence when the three alternative distribution scenarios are put to direct vote. Accordingly, they will vote on the alternative that promises the highest obtainable revenue surplus against the initial position S_0 for their respective communes. Likewise, financially strong communes losing out to poorer ones in terms of receipts in all three scenarios will presumably opt for the alternative that implies the lowest possible revenue cut compared to their initial position.

To find out which of the three scenarios have the greatest chance to win on a cantonal scale when the question is put to direct popular vote, we picked out the maximum of the three difference values appearing in every single line of the simulation worksheet, at the cross sections with columns 26, 30 and 35. Then we counted how many communes would opt for each of the three scenarios and how many communes would be in opposition.

Results show that in case of a direct vote, S_1 (continual indices of fiscal capacity) would be the winning alternative, with the support of two-third of the individual votes (the population figures of the supporter communes add up to 156'834, which corresponds to 66.5 % of the total population in the canton). Scenario S_2 (classification with six classes) would come out second, with 21.2 % of the votes, although the number of communes that prefer this scenario is not much lower than those favouring S_1 (70.5 against 79.5), which indicates that this alternative is proposed predominantly by small communes. Finally, S_3 (classification with twelve classes) would attract a modest 12.3 % of the total population of the canton.

3.3.2 Per-capita results

The combined line-and-bar chart in Annex 3 allows us to trace the development of the net fiscal position of inhabitants in the communes in case of the alternative scenarios S_1 , S_2 and S_3 . The basis of comparison is the outcome of a constant linear distribution of the given one million Swiss francs as it happens in scenario S_0 . Each of the two bar charts (representing S_2 and S_3) as well as the curve diagram (S_1) plotted in the box use the same variables: the

dependent variable, on the horizontal axis, is the global index of fiscal capacity in the commune (E_i), while the independent variable, on the vertical axis, is the net difference in revenue surplus divided by the legal population 2000, compared to the revenue surplus that would result from a linear distribution in S_0 . Evidently, the distributional incidences of S_0 yield a constant linear function (with every commune receiving 4.24 Swiss francs per inhabitant) that perfectly coincides with the horizontal axis, since the zero per-capita marginal net benefit (or transfer revenue) is the starting point for our comparison.

In the alternative scenarios, obviously, the index of global fiscal capacity is relevant, as its actual value determines the net marginal revenue the inhabitants can gain or lose through the respective equalisation schemes. Accordingly, by means of their equalising component, all three alternative distribution patterns will lead to a situation where the communes with the weakest fiscal capacity (communes situated on the horizontal axis near the origin) gain the highest surplus revenue per capita, while communes with strong finances compared to other communes within the canton (close to the right end of the horizontal axis) are forced to receive less or to pay more to maintain the cantonal equalisation policy. In each alternative case the per-capita incidences of distribution are thus illustrated by downward sloping functions that express the inverse relationship between the fiscal capacity of the commune and the change in the net fiscal position of the inhabitants. Differences are observed solely in the position of the functions within the two-dimensional space of co-ordinate axes, as well as in their shape (line or scale, depending on the continuity of the function).²¹ The graph demonstrates that, in terms of the volume of effective equalisation, S_3 performs better than any other alternatives. The additional amount of benefit drawn by the inhabitants of communes with low fiscal capacity and, likewise, the marginal contribution paid by the residents of well-off communes, are higher than in either of the alternative scenarios S_1 or S_2 .

5. Conclusions

The formally vertical, latent horizontal system of fiscal equalisation in the Canton Fribourg raises several questions about the actual incidences of the transfer allocation. The evaluation of the incidences allows researchers to make judgements about the quality of equalisation and to measure its conformity with the guiding principles established by policymakers. It also spurs them to

²¹ In order to make up for the absence of an additional six-class scale on the horizontal axis, in the graph we reduplicated the bar charts of the S_2 distribution function. This is meant to indicate that classes 12 and 11 in S_3 together approximately correspond to class 6 in S_2 . This assumption is certainly not quite appropriate, yet it is necessary in order to avoid the overcomplication of the graph. Annex 1 explicitly shows that the reclassification of communes from a six-class into a twelve-class system has necessitated some minor adjustments to the original set of thresholds, otherwise the principle of non-concentration (or equal distribution) of communes across the classes could not have been respected. The observation of these adjustments, however, would force us to accommodate two different, not-overlapping scales on the same axis (X), which would probably make the graph less easy to read.

draw up other distribution patterns and compare these to the existing system in terms of equity and efficiency.

Based on four different patterns of transfer distribution, the simulation of incidences on each of the 206 communes in the Canton Fribourg has led to a number of remarkable conclusions. These can be summarised as follows:

- The choice of the most appropriate distribution pattern by the canton depends heavily on the choice of the primary objective of the local equalisation policy.
- If the prior interest of the cantonal equalisation policy lies in maximising the number of beneficiaries (i.e. the scope of equalisation), a distribution system based on a continual scale of fiscal capacity index values performs better than any classification-based system.
- If the canton seeks to maximise the volume of effective equalisation, a system of twelve classes is likely to bring more favourable results than either the six-class system or the continual index scale.
- In case the question is put to direct popular vote in every commune, those distribution schemes that establish a direct link between the actual fiscal capacity of the commune and the size of the accessible grant will enjoy more support among the voters than any of the classification-based distribution schemes, as these latter fail to provide such a link.

Considering that the simulation results do not show a convincing case for S_2 , the pattern currently used in the Canton Fribourg, the researchers of the University of Fribourg will launch further studies with the aim to explore the reasons for the relatively weak performance of this pattern. At a later stage of the research, a number of alternative patterns may have to be checked on their quality in terms of distributional equity and efficiency.

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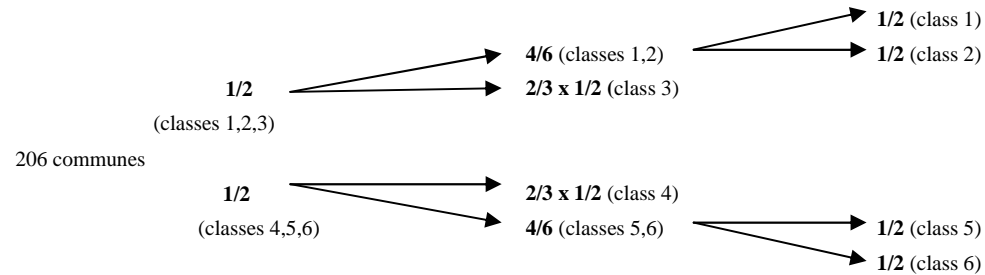
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Annexes

ANNEX 1: Classification procedure (methodological supplement)

A. Theoretical probabilities of class assignment in scenario S₂ (method of moving averages, classes from 1 to 6)



Theoretical probability*

$1/2 \times 4/6 \times 1/2 =$	1/6
$1/2 \times 4/6 \times 1/2 =$	1/6
$1/2 \times 1/2 \times 2/3 =$	1/6
$1/2 \times 1/2 \times 2/3 =$	1/6
$1/2 \times 4/6 \times 1/2 =$	1/6
$1/2 \times 4/6 \times 1/2 =$	1/6

*Probability for a commune of falling in the respective class

Upper limit of class 3: $100 + 2/3 \times (E_{1,2,3} - 100) = 100 + 2/3 \times (130.46 - 100) = 120.31$

Lower limit of class 4: $100 - 2/3 \times (100 - E_{4,5,6}) = 100 - 2/3 \times (100 - 82.55) = 88.37$

where $E_{x,\dots,z}$ = average index of the fiscal capacity of communes in classes x to z

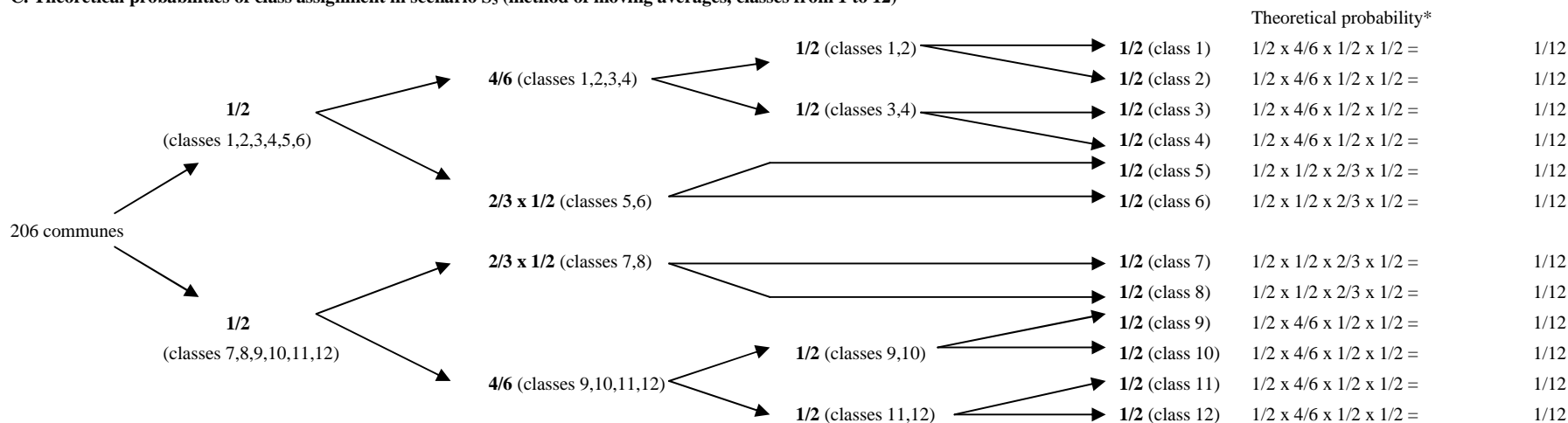
B. Threshold values for S₂ (years 2003-2004)

Class	Lower limit	Upper limit
6		78.50
5	78.51	88.36
4	88.37	99.99
3	100.00	120.30
2	120.31	156.26
1	156.27	

Source: (Dafflon, 1981: 112); (Conseil d'État, 1989b: 17); and Department of Communes of the Canton Fribourg.

ANNEX 1 (continued): Classification procedure (methodological supplement)

C. Theoretical probabilities of class assignment in scenario S₃ (method of moving averages, classes from 1 to 12)



Upper limit of class 5: $100 + 2/3 \times (E_{1,2,3,4,5,6} - 100) = 100 + 2/3 \times (130.46 - 100) = 120.31$

Lower limit of class 8: $100 - 2/3 \times (100 - E_{7,8,9,10,11,12}) = 100 - 2/3 \times (100 - 82.55) = 88.37$

where $E_{x,\dots,z}$ = average index of the fiscal capacity of communes in classes x to z

*Probability for a commune of falling in the respective class

D. Threshold values for S₃ (hypothetical values)

Class	Lower limit	Upper limit
12		72.98
11	72.99	78.51
10	78.52	83.22
9	83.23	88.36
8	88.37	93.39
7	93.40	99.99

(continued)

Class	Lower limit	Upper limit
6	100.00	108.95
5	108.96	120.31
4	120.32	132.80
3	132.81	156.27
2	156.28	191.47
1	191.48	

Source: own calculation based on (Dafflon, 1981: 112) and (Conseil d'État, 1989b: 17).

ANNEX 2: Fragment of the original simulation worksheet**Input data series for a selected commune and Canton Fribourg and procedure of data processing**

Input data										
Federal no.	Commune	Legal population	Resident population	Legal population	Area	Number of full-time employed	Tax revenue 1999	Tax revenue 1998	Average tax revenue	Per-capita average tax revenue
		31.12.2000	31.12.2000	31.12.1990	km ²		CHF	CHF	CHF	CHF
i		LP _i ⁽⁰⁾	RP _i ⁽⁰⁾	LP _i ^(t-10)	A _i	L _i			T _{cantonal(i)}	T _{cantonal(i)} / LP _i
1	2	3	4	5	6	7	8	9	10 = (8 + 9) : 2	11 = 10 : 3
2171	Arconciel	654	650	559	6.11	46	1'924'297	1'967'448	1'945'873	2'975.34
...
	Canton Fribourg	235'757	241'171	207'345	1'591.36	73'170	573'848'535	568'437'962	571'143'249	2'422.59

	Indices									
	Indicator of local fiscal resources	Population density	Population density index	Rate of economic activity	Economic activity index	Rate of demographic growth	Demographic growth index	Indicator of local financial needs	Global index of local fiscal capacity	Class
		(persons/km ²)		(%)		(%)				
	LFR _i		PD _i		EA _i		DG _i	LFN _i	E _i	C _i
12	13 = 4 : 6	14	15 = 7 : 3	16	17 = 3 : 5	18	19 = (14 + 16 + 18) : 3	20 = (2x12 + 1x19) : 3	21	
Arconciel	122.82	106.38	88.87	7.03	164.02	16.99	98.35	117.08	120.91	2
...
Canton Fribourg	100.00	151.55	100.00	31.04	100.00	13.70	100.00	100.00	100.00	

ANNEX 2 (continued): Fragment of the original simulation worksheet

Input data series for a selected commune and Canton Fribourg and procedure of data processing

	S ₀ : causal distribution		S ₁ : index value continuum		
	Communal quota in S ₀	Total transfer in S ₀	Communal quota in S ₁	Total transfer in S ₁	Difference (S ₁ -S ₀)
		CHF		CHF	CHF
	$LP_i / \sum LP_i$	$(LP_i / \sum LP_i) \times 1\,000\,000$	$LP_i \times (100 / E_i)$	$[LP_i \times (100 / E_i) \times 1\,000\,000] / \sum [LP_i \times (100 / E_i)]$	$\Delta (S_1 - S_0)$
	22	23	24	25	26 = (25 - 23)
Arconciel	0.002774	2'774	541	2'279	-495
...
Canton Fribourg	1.000000	1'000'000			

	S ₂ : distribution by classes (1 to 6)				S ₃ : distribution by classes (1 to 12)				
	Inverse class (or weight) in S ₂	Communal quota in S ₂	Total transfer in S ₂	Difference (S ₂ -S ₀)	Class in S ₃	Inverse class (or weight) in S ₃	Communal quota in S ₃	Total transfer in S ₃	Difference (S ₃ -S ₀)
			CHF	CHF				CHF	CHF
	$C_{i(inv)}$	$LP_i / C_{i(inv)}$	$[(LP_i / C_{i(inv)}) \times 1\,000\,000] / \sum (LP_i / C_{i(inv)})$	$\Delta (S_2 - S_0)$	$C_{i(3)}$	$C_{i(inv)(3)}$	$LP_i / C_{i(inv)(3)}$	$[(LP_i / C_{i(inv)(3)}) \times 1\,000\,000] / \sum (LP_i / C_{i(inv)(3)})$	$\Delta (S_3 - S_0)$
	27	28	29	30 = (29 - 23)	31	32	33	34	35 = (34 - 23)
Arconciel	5	131	1'399	-1'375	4	9	73	1'344	-1'430
...
Canton Fribourg			1'000'000					1'000'000	

ANNEX 4: Change in the net fiscal revenue per inhabitant as an outcome of a switch from S_0 to alternative scenarios

