***A History of the Allocation of Common Costs in France between 1914 and the 1950s via the Evolution of Equivalence Methods***

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**Abstract** : The allocation of common costs constitutes one of the major problems of costing, and numerous past studies have contributed to the understanding of its evolution. This article examines the approaches proposed in France between 1914 and the 1950s, and shows that each new method has sought to strike a balance between three requirements: Precision, operational ease for administrative and accounting personnel as well as intelligibility for the managers and engineers who decide on the choice of model to be used. The effects of this compromise can be determined by examining the role of the various equivalence methods devised between 1914 and the 1950s.

To understand what led to the emergence of these new methods, we briefly refer to the profound ideological, political, economic and social changes of the period, highlighting their influence on the functions assigned to costing. Furthermore, the article shows not only the logical determinism of this history of allocation of common costs, but also the role played by individuals involved.

**Key words:** *History, costing, common costs, equivalence methods, France*

**Introduction**

Changes over time in methods for allocating common costs[[1]](#endnote-1) have regularly been discussed in well-known studies of the history of costing [Littleton (1933), Edwards (1937), Solomons (1952), Yamey (1949), Pollard (1965), Parker (1969), Chatfield (1971, 1974), Chandler (1977), Wells (1978), Johnson and Kaplan (1987), Holzer and Rogers (1990)]. The key features of the different techniques and their successive modifications are essentially presented as responses to managers’ needs for adapting to changes in the economic environment. Alongside these perspectives, many articles have focused on the appearance of a particular costing technique in specific countries or periods[[2]](#endnote-2). Interesting though they are, these studies have not generated any hypothesis that could be transposed to a general perspective. The primary aim of this article is to propose an overview of changes in allocation methods for common costs, by bringing out the internal determinism of their rationale. To demonstrate this dynamic aspect we consider, along with the major authors of costing history, that economic causes play an important role. Nonetheless, we feel it is necessary to broaden the field by including certain factors of a social, political and ideological nature as well as the important roles played by several individuals.

Regarding the internal logic of allocation methods for common costs, we shall argue that it is the expression of an unstable equilibrium resulting from the chronic dissatisfaction associated with the tension between the three requirements to which common cost allocation methods seek to respond. This tension can be summed up as a trade-off between the precision sought in cost allocation, the simplicity of administrative resources needed to make the system operational, and the intelligibility of the model, which must be understood by the managers who ultimately must decide whether or not to use it[[3]](#endnote-3). Again, this relates to the inherent difficulty associated with information on costs, which aims not for truth but for relevance, and therefore must strike a compromise between precision and usefulness, between the function assigned to the information and the price people are prepared to pay for it (Zelinschi, 2008). This is a classic accounting dilemma (found, for example, in the foundations of the IASB and FASB conceptual framework) and a typical management science problem, that can be defined as “a recurring dilemma faced by managers” (Nikitin, 2006, p.96)[[4]](#endnote-4), associated with an epistemological reflection in which the key concern is to recognise in the succession of methods “the persistence of the problem in a solution thought to have been found” (Macherey, 2009, p. 55)[[5]](#endnote-5). However, a temporary resolution of the dilemma must necessarily depend on the historical contexts in which allocation methods for common costs emerge.

While equivalence methods are not the primary subject of this article, studying them and their development will explain the problem posed by the fragile, and constantly questionable, compromise at which a common cost allocation method may arrive in its search for equilibrium. The common feature of equivalence methods is their simplification of calculations: They artificially reduce multi-product or multi-activity companies to companies that produce only one product, or a very small number of product families. They assume that all production can be considered as a multiple of the production of one standard article. They are, nevertheless, fairly heterogeneous, and we propose a three-level classification based on their chronological order of appearance (Table 1). Traces of “Level 1” equivalence methods are visible as early as in the 19th century, when the aim was to use a benchmark unit based solely on certain costs (raw materials, labour, etc), weighted in order to calculate an overall coefficient of equivalence. “Level 2” equivalence methods were invented in the first half of the 20th century. They are full-cost methods (“cost number” and “points” methods, the French *sections homogènes*[[6]](#endnote-6) method and the Cegos method), which use the equivalence principle as incidental support to grouping cost centres and simplifying calculations. Lastly, the 1950s saw the arrival of new solutions independent of previous allocation methods, which calculate costs according to equivalence ratios between the various processes in complex production; we call these “Level 3” equivalence methods. This chronology does not imply that each new method supplanted the previous method; on the contrary, the older method continued to exist alongside the new and apparently innovative arrival.

Table 1: Typology of Equivalence Methods

|  |  |  |
| --- | --- | --- |
| Period of emergence of equivalence methods in France | Features | Examples |
| Pre-1914  -“Level 1” or empirical equivalence methods. | For each item, an equivalence is established with the basic unit (article, product, service, etc), weighted to calculate the overall equivalence coefficient for the product concerned. | The “kilometric wagon” used by Adolphe Jullien (1844), adopted by Proudhon (1855). Other cases are to be found in the textile (Dubus-Delos, 1924, 165) and the mining industries (De Beelde, 1995). |
| 1914-1950  -“Level 2” equivalence methods, complementing the machine hour method. | These are used in addition to methods that allocate common costs to cost centres. They make it possible to group cost centres based on equivalences. | Methods:  *Sections Homogènes*  Cegos method |
| 1950s  -“Level 3” or “stand-alone” equivalence methods. | These methods are independent of earlier allocation methods, and calculate costs based on equivalence ratios between the various processes of complex production. These equivalence ratios consider all manufactured products as multiples of a basic unit, such that common costs no longer exist, since all costs are expressed as units. | Methods:  Points method  GP method |

Our article studies the case of France since, to our knowledge, which is where we find the most highly-developed early techniques using equivalence methods. The period studied begins in 1914 since, until then, the allocation of common costs had been relatively unsophisticated in practice: It was limited to the use of an overall coefficient, which will be discussed briefly in the first section. Our study ends in the 1950s after the emergence of stand-alone equivalence methods, but before the spread of direct costing in France following its importation from the US. Thus, the simplification trend took a new turn, but beyond the question of common costs examined here, studying direct costing would require an examination of the distinction between variable and fixed costs, which is beyond the scope of this article.

Methodologically speaking, the history of allocation methods for common costs proposed in this article is primarily based on knowledge of those methods[[7]](#endnote-7) drawn from a study of the relevant literature. Apart from the difficulty, if not impossibility, of measuring the extent of the adoption of innovations in a historical research context, the role played by communication channels (academic journals, professional journals, books, etc) in the dissemination of innovations in general and costing methods in particular has been widely emphasised (Alcouffe et al, 2008; Malmi, 1999; Bjornenak, 1997; Rogers, 1995; Abrahamson and Fairchild, 1999). Certainly, these publications reveal problems concerning existing methods and the attempted responses[[8]](#endnote-8). This article is based on both written and oral sources. All sorts of material, clues and traces (Ginzburg, 1989) are useful to the historian: “*History is doubtless made with written documents*. *But it can be made, it must be made, without written documents... With all that the historian’s ingenuity allows him to use…”* (Febvre, 1953, 428).

A number of printed sources have been consulted: Both professional journals as well as trade union reports, textbooks, and brochures published by professional training organizations in France. For the latter, we relied on the *Fonds Ernest Stevelinck* at the library of the university of Nantes, which has France’s largest collection of works on accounting techniques and the history of accounting. We also consulted archives such as the archives of the Paris Chamber of Commerce and Industry, which include the CPA[[9]](#endnote-9) collection of case studies intended for executive training, the Jean Coutrot[[10]](#endnote-10) archives, and the private archives of the Perrin family[[11]](#endnote-11). In addition, the corporate archives of Renault and Berliet provided information not only on the methods for allocating common costs, but also on the debates associated with these methods. These two large corporations, which were at the forefront of France’s second industrial revolution, were chosen because - as the surviving archives show - they were key venues for costing innovation in the early 20th century and were viewed as examples by other organisations. The second type of source, used to grasp changes in costing methods in France since the 1950s, consisted of interviews with persons connected with knowledge of the period: Three heads of the Cegos[[12]](#endnote-12), and Georges Perrin’s son.

The article begins in 1914 and covers the period up to the 1950s. During that time, four new common cost allocation methods emerged, seeking to correct a previously-criticised lack of precision, difficulties in application, or problems of intelligibility. We identify four sub-periods, each with the same structure: For each, the technical changes in allocation are described, then examined in the light of the events that led to a revision of the previously recommended approach. Between 1914 and 1928 (Section 2), the “machine hour” rate emerged to improve precision in overhead monitoring at a time when France’s second wave of industrialisation was increasing the contribution of fixed assets to cost price structures. Between 1928 and 1936 (Section 3), Rimailho proposed a *sections homogènes* method to facilitate administration by grouping together several centres in an approach he considered coherent with the French management style. Between 1936 and 1950 (Section 4), the Cegos method made Rimailho’s method more accessible by shifting the focus away from homogeneity and instead recommending grouping by major functions; this made the method easier to understand for everyone at a time when employers’ organisations and public authorities wanted all companies to adopt a uniform costing method. Finally, in the 1950s (Section 5), the old methods of allocation were overshadowed by American ideas on management and came to be considered overly complicated and inappropriate for decision-making. Consequently and partly due to rising inflation, standard cost approaches as well as stand-alone equivalence methods were now favoured.

**ALLOCATION OF COMMON COSTS BASED ON MACHINE HOURS IN FRANCE, 1914-1928**

Any attempt to calculate the cost of an object comes up against the difficulty of identifying certain expenses that make up that cost, particularly those that have been used for several products without really knowing to which they should be attributed as in the cases of asset depreciation or the wages of personnel in charge of coordinating management. In the first treaties on industrial accounting in France, dating from the early 19th century when the level of these expenses was low, they were simply charged directly to the debit side of the profit and loss account (Nikitin, 1992, 383; Parenteau, 1946, 9). However, as the complexity of industrial processes increased, the portion of common costs in cost prices rose, and managers, engineers and accountants devised several methods for allocating common costs “using a coefficient proportional to expenses for the material, or for labour, or for both combined” (Léautey and Guilbault, 1889, p. 308). This process is also found in the books on costing that were published between the late 19th century and the First World War (Zimnovitch, 1997a, 104-110). During that period, which lasted some thirty years, another method appeared in the US, namely that of the machine hour. Traces of this method can be seen in French publications and companies from the 1900s, but it did not really catch on until 1918.

It is probable that a logical determinism associated with mass production, rising overheads, and competition prevailed over the allocation of common costs via cost centres that were defined in increasing numbers for greater precision. This is a reflection of one of the pillars of Descartes’ method: “dividing each difficulty into as many parts as might be possible and necessary to best solve it” (Descartes, 1966, 39). An analysis of the emergence of the machine hour method in France cannot, then, rule out the possibility that this method might have been devised independently of American efforts. But its spread in France was undeniably broadly influenced by the publications of Taylorian engineers, an aspect we will study further. It is also certain that pioneering companies in production management, such as Renault, in some way influenced changes in common cost allocation according to the type of machine used.

**The role of Taylorian engineers in the spread of machine hour methods in France**

The machine hour method did not become known in France until the First World War. This method is based on the idea of dividing the company into “production centres” such as a machine or a type of machines, or a workstation (grouped such that the method’s homogeneity[[13]](#endnote-13) is respected). Next, indirect production costs are allocated between these centres according to allocation rules that may be based on surface area, consumption, etc. Finally, the total costs of these “production centres” are allocated to product costs based on hourly rates, calculated by dividing the total costs accumulated by the “production centres” by the number of machine hours considered normal for the period concerned.

The machine hour method was warmly welcomed as the idea of a country that symbolised the new industrial rationalisation, driven by the need to organise the war effort. It was both imported by American Taylorian engineers and transposed into French publications such as those by Charpentier (1919) and Blandin (1928), as well as professional journals such as the *Revue de la Métallurgie*[[14]](#endnote-14), a channel for Taylorian ideas in France since 1915. There are credible indications that it was actually implemented by companies: for example, the fact that several American engineers came to France after an appeal in 1917 by the then Minister of Armament Louis Loucheur, to contribute to the war effort by presenting new management ideas. Some of them even stayed in France and set up their own consultancy businesses (Moutet, 1992, 1997). One of these was Clarence Bertrand Thompson (1882-1969), a lecturer at Harvard from 1911 to 1917. On arriving in France, he opened the first management consultancy office in Paris and published three editions of a book devoted to American costing methods (Thompson, 1920, 1924, 1928). Another was Paul Atkins, who was married to a Frenchwoman and lived in France between 1924 and 1925, working as a lecturer at HEC-JF[[15]](#endnote-15). He defended a dissertation at the Sorbonne on the teaching of costing, which was subsequently published (1923). As well as their physical presence in France, American engineers wrote books on costing that were at least circulated in France, and sometimes translated into French (Lemarchand, 1998). In addition to the works of Atkins and the three editions of Thompson's book mentioned above, the works by Charles Buxton Going and Henry Lawrence Gantt were translated into French in the 1920s by André Blandin, a graduate of France’s prestigious engineering school *Ecole des Mines*, and published by Payot in a collection of books on management called *La bibliothèque de l’industriel* (the industrial manager’s library).

**The role of pioneering French companies in the spread of the machine hour method**

Alongside publications by Taylorian engineers, two other initiatives deserve some attention in order to understand how the allocation of common costs based on machine hours changed in France shortly before 1918. These initiatives were taken by printing businesses and Renault respectively. Other examples exist, including the foundries (Moutet, 1922), but they do not have the same symbolic dimension and their influence was less extensive.

The example of the printing businesses is symbolic in more ways than one. Printing was an industry that required expensive, high-tech machines in the late 19th century. The machine operators were highly skilled, which naturally affected costs, but also meant that employees were open to new organization techniques. Lastly, the printing trade was one of the first to feel the need to protect itself against knockdown prices resulting from poor knowledge of the cost price. This explains why it promoted a costing method based on machine hours as early as the turn of the 20th century (Powell, 1926). French printer Delmas followed this movement, attending several conferences held by fellow printers in America, including some specifically dedicated to costing (Lemarchand and Le Roy, 2000). He published a book about his experience, discussing the allocation of overheads to cost centres (Delmas, 1900).

This example symbolises the change in allocation of common costs in France: The American influence is clearly present, but it is unclear whether it had any effect. In the case of the method used by Renault, the opposite applies: The American influence on costing is not clear, but its influence on other organisations is clearly visible. In the early 20th century, the French automobile industry was one of the spearheads of Scientific Management[[16]](#endnote-16) (Moutet, 1997, p. 89-110), and Renault was the industry’s leading firm. Renault also has the advantage of having been the subject of high quality research in the period (Fridenson, 1972), including studies of the accounting question (Bhimani, 1992). The availability of archives and up-to-date information on the question of how to allocate common costs for costing calculations makes the case particularly instructive for this article. Louis Renault sold his first car in 1898, and through innovation and industrial vision in a market experiencing hyper-demand brought his company up to become one of France’s largest at the eve of the First World War. Growth continued during the war thanks to military orders. During this period, accounts were reorganised in order to make it easier to allocate overheads more precisely through the use of the machine hour method (Zimnovitch, 1997a).

There were several reasons for this movement. One of the arguments for more precise calculation of cost prices put forward by Meurisse, who was in charge of the reorganisation of “accounting - overheads” from 1916, was the need to justify sale prices to the military[[17]](#endnote-17). The question is whether he, to achieve this aim, designed the system himself, defining precise details for the allocation of common costs, or did he take his cue from the writings of one of the Taylorian engineers discussed earlier? His reference to Taylor’s recommended method in his book “*La Direction des Ateliers*[[18]](#endnote-18) (Workshop management) appears to support the second theory. However, this only briefly sketches a coefficient method without setting out the proposed process for the allocation of common costs. It is entirely possible that Meurisse himself may have arrived at a method already found in France in the 18th century, in the Compagnie des Indes or foundry business accounts. 19th century books on farm accounting describe a division of the company similar to the machine hour method, while in the same period, the Schneider brothers used a comparable rationale to monitor their steelworks, as did military arsenals (Lemarchand, 1998).

It may be impossible to determine whether the method developed at Renault in 1917 for the allocation of common costs was invented by Meurisse, or whether he drew on American methods (the most likely answer being that it was a combination of the two), but what is certain is that it generated a certain amount of publicity both inside and outside the company. Several issues of the in-house newsletter *Bulletin des Usines Renault* refer to it and use figures (see Figure 1) to show the importance of common costs compared to labour costs, and the dangers of following the commonly-used overall coefficient method[[19]](#endnote-19). The Automobile Manufacturers’ Chamber bulletin “*Bulletin officiel de la Chambre syndicale des constructeurs d’automobile”* echoed these concerns as early as in January of 1918, and one of the Chamber’s members, Marius Berliet, conducted a study on the question (but no actual application ensued[[20]](#endnote-20)). However, from 1919 the instructions followed by artillery manufacturers for their industrial accounts were inspired by the Renault memo on overheads and the textbook for the Administration and Accounting course taught by General Delavallée at the *Ecole Supérieure Technique d’Artillerie* (1928, 52-66). This memo is reproduced in Lemarchand (1998, 89)[[21]](#endnote-21).

Echoing developments in the US, the rise in common costs provided an incentive for more precise allocation in costing in France from the beginning of the 20th century, be it to better control costs, to justify a selling price, or to establish a professional standard and fight a fall in prices. A further factor in these developments was the role played by the engineers. No doubt their rationality drove them to invent more advanced allocation methods than the overall coefficient, especially as they saw this as a way of legitimising their role in the organisation (Moutet, 1997). Finally, the emulation effect cannot be ignored: Models used by enviably successful competitors are invariably copied. At the national level, this was how French companies felt about American companies, while at the industry level it was how carmakers felt (Zimnovitch, 1997a, 433-447).

**The arrival of level 2 equivalence methods: 1928-1936**

As seen earlier, French companies and military establishments began reflecting on the allocation of common costs at the start of the twentieth century, in order to incorporate them more precisely into industrial processes. This led to a proliferation of “production centres” and made application of the method very difficult. In both the US and Europe, the idea of using equivalence methods (level 2 methods, see above) emerged to facilitate operational application.

**3.1 Amendment of cost centres**

In the early 20th century, equivalence methods were devised in the US to reduce the number of centres necessary under a *cost numbers[[22]](#endnote-22)* reasoning. Taylor, for example, who set up several industrial accounting systems (Chandler, 1977, 412; Aitken, 1960; Chen and Pan, 1980; Wells, 1982), changed the “production centres” method to make it simpler to use (Garner, 1954, 196)[[23]](#endnote-23). In the cost numbers approach, costs are initially allocated between workshops. Next, all common costs allocated to each of the workshops’ machines (depreciation, insurance, taxes, etc) are included, such that total costs can be calculated for each machine, and calculated as a proportion of the total costs of the other workshop machines. This is what Taylor calls a “cost number”. In the subsequent stages of costing, the time used as a basis for allocation is the actual machine time multiplied by the “cost number”, to give a “cost number charge”. The total of all “cost number charges” in each workshop is then used as a basis for allocating common costs[[24]](#endnote-24). This device maintains homogeneity.

A different author, Webner (1917, 1924) proposed a method called the “points method”. In this method, the overheads from one cost centre are allocated based on a product equivalence rate, which is itself related to their use of direct labour hours. Webner named this method the “points method” because the various products are expressed in points based on direct labour hours used compared to the standard product (the product that requires the most direct labour hours).

It can easily be argued that these methods incorporating equivalence-based solutions, which at the time were seen as a reasonable alternative in the US, were imported to France by the American Taylorian engineers. The question of costing was addressed, especially with the machine hours method. The notion of Taylor-style “cost numbers” was not adopted to the letter, but the idea is visible in by Buxton Going’s comments: *“We often group machines into classes and calculate the hourly rates for each class instead of taking each machine individually”* (1922, p. 136). We have also identified traces of similar methods in the French-language literature in the writings of Trossen (1935, 79) and Blairon (1926, 176).

In 1927, and at the initiative of the *Commission Générale d’Organisation Scientifique du Travail* (CGOST[[25]](#endnote-25)), Frenchman Emile Rimailho (1864-1954), a *Polytechnique-*trained engineer[[26]](#endnote-26), military officer and business manager[[27]](#endnote-27), set up a branch of the *Confédération Générale de la Production Française* (CGPF, an organisation formed by employers after the First World War to bring together several different employers' associations, give members management training, and promote and represent their interests to the authorities and employees’ unions). Rimailho adapted the traditional division of business into cost centres for more logical correlations between monetary resources and manufactured products[[28]](#endnote-28). His proposed method was one he had already introduced as a manager at the CGCEM, and had observed earlier during his time at French military arsenals.

The division of the company is found in many other costing methods of the period, but the unusual thing about the Rimailho method lay in the homogeneity-based rationale of what he first called “workshop sections” in 1927, then “homogeneous sections” in 1928. A section was identified simply by grouping identical machines or operators performing identical tasks. They were not Taylorian workshops, but *“the combination of interdependent resources, not because they are identical but because they are interdependent”* (Bouquin, 1997, 71). This approach to grouping respects homogeneity:

*“To be homogeneous, a section is formed such that the various professional specialities making it up are in principle used in the same proportion for all work done by the section and the items of different value, including the equipment, encountered in each speciality are themselves used in the same proportion in all the work. A section may, for example, comprise milling machinists, planers, and drillers, if the relative value of the milling, planing and drilling work is in general the same for all the work assigned to the section”* (Rimailho, 1928, 66).

All costs except for those of raw materials are grouped into sections. Some are called “productive” and allocated directly to the products, while others are called “auxiliary” and allocated across the “productive” sections. Another concept specific to Rimailho is the work unit deriving from the Homogeneous Sections. The common unit of measurement that would be used to allocate a Homogeneous Section’s costs to the products was time: *“the very definition of homogeneous sections makes it possible to consider all work assigned to a section as leading to expenses whose disparity depends solely on the disparity of the time spent performing it”* (Rimailho, 1928, 69). The “hourly rate” or “section hour” was calculated by dividing the total costs for all sections by the number of direct labour hours used in the sections. Homogeneity made this use possible: *“If the assembly section cost 15,000 francs and performed 1,000 hours of work, each fitter’s hour cost 15 francs. The more homogeneous the section, the more legitimate the application of this average cost will be”* (Rimailho, 1947, 6).

By construction, homogeneity makes it possible to reduce the number of cost centres and overcome the criticisms levelled, for example, at Church’s method (see the Buxton Going quotation from 1922 above) which was deemed excellent in principle, but too difficult to put into practice. This reduction was achieved through the principle of equivalences. The *sections homogènes* method is thus a “Level 2” equivalence method in which the direct labour hour, or later the work unit (see below), is the unit of equivalence.

*“If the Establishment concerned constantly produced one, and only one object... the production Establishment would be reduced to a single homogeneous body or a homogeneous section… Since the practice never matches the theoretical case, if we wish to retain the apparently useful idea, we have no other solution but to break down the Establishment… into homogeneous sections, which then operate like the theoretical case”* (Cegos, 1938, 78).

This method was to become the standard method in French management accounting (and was incorporated into the official French charts of accounts (*plans comptables*) of 1942, 1957 and 1982).

**French management: Social costing**

Rimailho’s accounting system was only the visible tip of his plans for the social aspects of business management. He saw costing as a measurement instrument that could be used to implement a new type of management for labour and its remuneration, consistent with the French approach.

*“We cannot establish laws for social management without the help of an instrument that is as precise as possible and measures each person's share in the profits”. (*Rimailho, 1939, 113.)

Inspired by social Catholicism[[29]](#endnote-29) and himself a member of the French Catholic engineers’ association *Union Sociale des Ingénieurs Catholiques*, Rimailho believed he had a role to play in business and society as a “social engineer”, in keeping with the recommendations of one of his predecessors Emile Cheysson[[30]](#endnote-30):

*“A manager needs special preparation. He must remain a technical engineer and tradesman but at the same time be a social engineer, combining strong professional knowledge with knowledge of institutions, which will build the firm’s prosperity on the wellbeing of the workers it employs*” (*Cheysson, 1897*[[31]](#endnote-31)).

Rimailho claimed that France was unusual in the way it implemented rationalisation:

*“In France, we must call on the basic qualities of our race that is so receptive to appeals to common sense and feelings. All the authors writing on rationalisation present the best ways to unite capital, labour and science, but they talk of this union a little too much like a marriage of convenience, and too often seem to forget that if a marriage is to be fertile, it is advisable to invite the driving force* par excellence *– love – to the wedding* (Rimailho[[32]](#endnote-32), 1929)*.*

In Rimailho's opinion, the social instrument of measurement is the costing method by *sections homogènes*.This method groups workers into teams in the workshops: Each Section has its own specific task which it executes under a single manager, and the section's autonomy is respected as fully as is possible and useful. However, the homogeneous sections were not simply accounting divisions, but real basic units of the organisation, *“self-managed united teams”* (Dubreuil and Rimailho, 1939, 114), and:

*“With all due respect for Taylor, who believed he had to contrast his “functional” method with what he called the military method, we see here military groupings of units deriving from military experience. This management will naturally give the Section its own personality in both preparation and performance of work. It develops the feeling of responsibility and gives rise to team spirit, engendering emulation that is enriching for the quality of work and discipline by dedication to the single, accessible manager (taking the name of occupational group leader). Initiative no longer runs up against indifference from an unknown, over-remote manager."*(*Rimailho*, 1936, 17)

The Section enables all workers to contribute to management by participating in the definition of tasks and setting times based on the average worker, with the aim of achieving the best return through collaboration rather than fear or surveillance.

*“The more this team spirit develops, the better the results are and the greater the obligation to reward each person's dedication fairly, especially as it happens under the eyes of the section leader and the other team members, who in the end are not many in number.”* (Rimailho, 1936, p.17)

The ideas of the autonomous team were not new. Traces were visible at the Cristalleries de Baccarat during the 1860s (Nikitin, 1994) and in the “small employers’” method used at certain automobile manufacturers such as Peugeot (Zimnovitch, 1997a). However, what certainly inspired Rimailho the most were the experiments at the Bat’a factories in what was then Czechoslovakia, and the writings of Hyacinthe Dubreuil, with whom he published a book (Dubreuil and Rimailho, 1939)[[33]](#endnote-33).

**THE CEGOS METHOD AND ITS MANIFESTATIONS: 1936-1950**

**Developments in the allocation method**

Whereas the overall coefficient method is considered to provide the most basic degree of precision in the allocation of common costs, but the simplest to apply and the least complex in terms of theory, the machine hour takes cost allocation to a high degree of sophistication. In fact, it goes further than the homogeneous sections method which loses some precision due to the grouping, but requires less work of the accounting and administrative personnel because it has fewer columns; however, it should be noted that the simplicity of application is achieved through the concept of homogeneity, which adds a theoretical difficulty. This rationale can be illustrated by the following table:

|  |  |  |  |
| --- | --- | --- | --- |
| Emergent method in France | Precision of allocation | Simplicity of allocation | Theoretical complexity |
| Pre-1914  Overall coefficient  method | \_ \_ | + + | \_ \_ |
| 1914-1928  Machine hour method | + + | \_ \_ | + |
| 1928-1936  *Sections homogènes*  method | + | \_ | + + |

The *sections homogènes* method, originally devised by Rimailho as part of an employer plan to promote scientific management, underwent changes that were to weaken its technical content following the social and political movements that swept through France from 1936. Among other changes, the definition of the “Homogeneous Section” became “a group of production resources, such that the operations it performs have a common measure to which its costs can be related" (Cegos, 1938, 78). Rimailho saw this as a distortion of his original idea:

*“In the book “A uniform method of costing[[34]](#endnote-34)”, the Cegos describes the homogeneity of the section by the common measure of its work unit. This condition is inadequate: depending on whether it is executing an order that needs processing several times or another that is only processed once, a rolling mill section does not have the same homogeneity and hence the same work unit… The section is unchanged, but ceases to be homogeneous if it is used for either role indiscriminately”* (Rimailho, 1947, 216).

We can only agree: Defining homogeneity by the existence of a work unit effectively confuses cause and effect (Bouquin, 1995, 65).

The 1942 *plan comptable* also brought about changes to the method (Martin, 1948, 74-76) by allocating product-related expenses to the cost of each product directly, without going via the homogeneous sections[[35]](#endnote-35). This made it possible to reduce the number of sections considerably, without reducing the homogeneity of the method. However, responsibility for determining “conventional allocation rules”, i.e. “work units”, was assigned to organization committees[[36]](#endnote-36) that had been created by the Vichy government while France was occupied. The 1947 and 1957 *plans comptables* later considered that homogeneous sections should correspond to a real division of the firm, while accepting that such correspondences did not always exist. In such cases “Fictitious sections” (PCG 1947) or “Calculated sections” (PCG 1957)[[37]](#endnote-37) were to be used.

These changes reduced precision compared to the Rimailho method, but naturally simplified application and made the system easier to understand for the people who had to choose whether or not to adopt it. As we shall see, this became an important factor in the following period. The machine hour method had already met with some reluctance, as noted by Bertrand-Thomson, one of the Taylorian engineers who settled in France:

*“the general impression created by my machine hour method, and still found among directors of most factories, is that this method is a new invention of the most mysterious and most complicated kind”* (1924, 56).

But the Rimailho method had also encountered incomprehension, as he said himself: *“we have an obligation to stress the importance of the homogeneity of the section, because we have not always made ourselves understood during the survey”* (Cegos, 1928, 66). From 1936, expectations of costing functions changed: Comprehension and system operational ease became more important, to the detriment of precision in the allocation of common costs.

**Impact of politics on the function of costing**

Rimailho made an important contribution to costing methods by being one of the first to explicitly raise the issue of the conditions of homogeneity[[38]](#endnote-38), which can lighten accountants’ administrative workload by reducing the number of cost centres. But this aspect of his method attracted little attention. When Rimailho designed his method in 1928, the main function assigned to costing was “technical”. In the early 1930s, costing was still part of a scientific management[[39]](#endnote-39) approach, in which rationality was the most important factor in the allocation of common costs. But with the political, social and ideological crises that shook France between 1936 and 1950, the preferred costing functions were related to regulating competition within a profession, justifying the selling price to third parties (State, unions, public opinion), and serving as a management tool for use in a planned economy. As we shall see, these were the objectives pursued by promoters of a uniform method of costing, even though they were partly inspired by Rimailho’s ideas. Two different periods are identified regarding the allocation of common costs: The period between 1936 and 1940, when the incentive to adopt a convention was dominant, followed by the post-1940 period, when the technocratic approach sought to be interventionist.

*A convention: 1936-1940*

After the Front Populaire came to power in 1936, France’s employers’ organisations and representatives of employees signed the “Matignon Agreements”, which led to significant increases in wage costs. Disoriented by this development, many business managers turned to their own organization for help in dealing with the situation (Ehrmann, 1959; Kolboom, 1986). This was the context in which the department in charge of costing at the CGPF, the Cegos, produced a brochure proposing *A Uniform method of costing. How and Why?* (1938) with common rules inspired by the homogeneous sections method, which, it was said, “form a valuable guide that avoids costly experiments, foster healthier competition by removing calculation errors, make comparisons possible, facilitate justification of price variations to customers and public authorities” (Cegos, 1938, 37-39).

Rather than approaching the cost price as precisely as possible, seeking its “true value” as so often before, the objective was to define a convention for the allocation of common costs that was understandable and applicable by the greatest number of companies, in order to compute full costs. The philosopher Pascal says it all in this *Pensée*: “*When we do not know the truth of a thing, it is of advantage that there should exist a common error which determines the mind of man*” (2004, 18).

From the public authorities’ standpoint, the brand new minister of the economy, Charles Spinasse, encouraged this approach by creating the National Centre for Scientific Management (COST) and appointing Jean Coutrot as its director. But it was only under the Vichy government, in which Spinasse was minister for a while, that the technocratic function of costing was given a new impetus with the production charter.

*A technocratic function: the post-1940 period*

As seen above, the recommended method for allocating common costs after 1940, included in the official charts of accounts, was very similar to the method presented by the Cegos in 1938. What was new was that an employers’ organisation initiative to encourage its members to adopt a method was mutating into a State-imposed technocratic obligation[[40]](#endnote-40).

The technocratic shift towards a government served by a body of technicians capable of giving the "right answer", rather than politicians, did not take place overnight in 1940. In France at least, it originated in the First World War, and continued well after the Second (Kuisel, 1984). But the pace of change clearly accelerated after France’s defeat, which opened up an opportunity for ideas already advocated before the war by the “*planistes*”, who wanted to replace liberal anarchy with an economy coordinated by technicians, and confrontation between capital and labour by class cooperation in guild-like bodies. The shift was embodied in several leading employers: Ernest Mercier, Jean Coutrot, Auguste Detœuf (Kuisel, 1967, 1975; Dard, 1993). They were graduates of the *Ecole Polytechnique*, like Rimailho, and were interested in costing with the aim of creating a chart of accounts that would be applicable to all companies. This is what Detoeuf had in mind when he made the following call in 1941:

*“For each profession, we must thus lay down on what basis all valuations will be established […]. This requires a type of industrial accounting kept by all industrials: Sufficiently uniform for easy calculation of professional cost prices”* (Detœuf, 1941, 18).

This idea was picked up in the 1942 *Plan Comptable*, with the intention of making it compulsory. The 1947 *Plan Comptable*, in contrast, was only optional (except for certain companies). This change in the *sections homogènes* method can be considered a mark of its institutionalisation (Lemarchand and Le Roy, 2000).

**stand-ALONE EQUIVALENCE METHODS AFTER 1950**

In response to the inappropriate full costing methods proposed in the 1950s, the growth and inflation of the period encouraged the development of stand-alone methods based on equivalences.

**The points method and the GP method**

While the Cegos method (which can be considered as a bastardised *sections homogènes* method, disassociated with Rimailho’s specific ideas on French management) continued to exist in the 1950s, new types of equivalence methods emerged. Two methods appeared to meet a new demand for simplicity: the points method and the GP method. These can be classified as “Level 3” methods, because they were independent of any cost centre (and therefore “stand-alone”; see the table). But despite in-depth analysis at workstation level, they were less precise in allocating common costs, because of the assumed stability of relations between various protection processes and higher theoretical complexity, as shown in the table below:

|  |  |  |  |
| --- | --- | --- | --- |
| Emergent method in France | Precision | Simplicity of allocation | Theoretical complexity |
| 1928-1936  *Sections homogènes* method  Level 2 Equivalence method | + | \_ | + + |
| 1936-1950  Cegos method  Level 2 Equivalence method | \_ | + | + |
| 1950-1960  Thibert and GP  Level 3 Equivalence method | \_ | + + | + + |

The points method was presented for the first time by Messrs Thibert and Martin in a series of lectures given as part of training programmes in 1951 then 1952 at the CNAM[[41]](#endnote-41) in Paris. It uses constant ratios and analysis at workstation level.

*“The point is a unit of measurement of identical technical events that is used to rank unit costs, where each elementary event is included in a set of identical events”.* (Lauzel 1973, 133).

The chosen division is the production workstation, which is associated with the number of points used (wage, raw material and expense points).

To calculate the *wage point*, the total wage cost is divided by the number of hours of pay for the various workstations, weighted by skill coefficients.

The *material point* is the actual per-kilo cost of material for a given product. Each use of material is translated into kilogrammes of the benchmark material by the application of a conversion coefficient defined at the outset.

For common costs, the authors lay down the principle that if the cost of an hour of labour for a section (common costs divided by the number of hours of labour) is taken as the basic standard, the hourly cost of other workstations in relation to that base remains constant as long as work processes and the company’s installations are neither replaced nor significantly modified. This constancy continues even in the event of monetary variation. Initially, the *expense point* is determined as being equal to the amount of common costs consumed per 1/100 hour of the workstation chosen as the standard. Using the same calculation for all other workstations, the equivalence coefficients can be determined, and will remain constant as long as no major changes are made. For each period, the hours used per workstation are registered. They are converted into “expense points” using the equivalence coefficients. The cost of the expense point for a period will be equal to the total amount of actual common costs divided by the total number of expense points. When the number of points allocated to a given product is known, calculating the cost of production comes down to multiplying the cost of points (materials, wages and expenses) by the number of respective points used by the product.

The division chosen is smaller than the section: It is the production workstation associated with the cost of the point, the work unit being the production hour. Budgeted expenses in the form of a budgeted hourly cost are then added to the production cost determined in this way. The stability of this method is based on the principle of the stability of constant ratios:

*“If we take the cost of an hour of labour of a section as the standard base for comparison, the ratios of hourly costs of other sections compared to that base are invariable constants until the working processes and company’s installations are replaced or significantly modified. Everything depends on the constancy of the ratio that materialises this ranking, but this constancy continues even in the event of monetary variations… This leads to a ranking of relationships between the various products that only changes when production methods are changed.”* (Thibert, 1952, 20).

The GP method was devised by Georges Perrin (1891-1958). Reducing the company to a single-product entity, he modelled it, using a common unit of measurement for the production effort: le GP[[42]](#endnote-42). This unit may be a specific machine or a particular part, known as the “base article”. The method consists of identifying, in advance, the use of resources by each workstation under normal operating conditions (standard cost approach). The workstation is defined as the set of material and human resources necessary to perform an operation, i.e. an elementary operation:

*“The theoretical elementary work operation must be understood as an operation defined in the smallest detail. For a lathing operation, for example, it is necessary to stipulate the machine type, the hardness of the metal being processed, the nature and sharpness of tools, the speed and depth of the cutting, etc. A difference in any one of these specifications forms a separate operation.”* (Perrin, 1962, 35)

Each workstation is assigned operating expenses (use of direct resources) per work unit, i.e. a direct unit cost excluding purchases, incorporated into income and expenses specific to a client, which the authors also call a “workstation rate”. The workstation costs are then expressed in GP. For each workstation a workstation index is calculated as the ratio of its use of resources to the base process (for the unit of value added). The workstation index is thus equal to the workstation rate divided by the “base rate”.

The cost of the various processes is also estimated, and expressed in GP, one process representing a specific use of the different workstations (a task list). The various products and processes are then calculated in GPs, based on their use of processes. All the company’s activity is thus measured in GPs[[43]](#endnote-43).

The “cost of value added” can thus be calculated for any product at any time as being equal to the cost of the GP multiplied by the number of production GPs for the process, expressed in GP equivalents. The cost of an article is the sum of the cost of materials incorporated into the products sold, customer-specific expenses and the costs of value added attributable to the article. The precision of the method depends on what Georges Perrin called the principle of hidden constants: *“Whatever the prices, the production efforts generated by the various theoretical elementary work operations of a factory show constant relationships over time”* (Perrin, 1962, 33), i.e. the stability of production relationships over time. This is an assumption that can simplify calculations, but naturally involves a degree of approximation.

The GP method can also be used to solve the inflation problem, as seen in two case studies prepared by the *Centre de Perfectionnement aux Affaires*: One from 1958 (the *Syndicat des Fabricants de Fils et Cables*[[44]](#endnote-44)), the other from 1960 (Sauvegrain et Cie), which states that the GP method makes it possible to “replace the franc as a unit of measurement, which neutralises the effects of inflation”[[45]](#endnote-45). But doubts were raised about the intelligibility of the GP system for anyone who is not a graduate of the top higher education establishments: de Ponfarcy, the author of these case studies, noted the “confused nature of the method it seeks to explain”[[46]](#endnote-46).

**Conditions for emergence: influence, inflation and Korea**

Given our argument that equivalence methods are “stand-alone”, we should *“examine the conditions of [their] appearance, starting with the emergence of the questions that drive them to it or the knowledge that makes it possible.”* (Simon, 2008, 99). To do this, we must look back at the economic and ideological climate of France during the early 1950s. It was a time of significant industrial growth, interest in management and rational administration (the fervent obligation of a planned economy) and a desire to bring the country into the era of management. All these factors were favourable to costing innovations (Boulat, 2006).

This demand was met by a new type of cost accounting, as used in the US. We know that the Europeans received substantial grants under the Marshall plan, provided they modernised their production environment based on American management methods (Bossuat, 1992). This was the idea behind the 1950 “productivity missions”, which gave many business managers, including accounting managers, an opportunity to visit American companies and attend lecture programmes presenting the latest innovations in their technical area (Kuisel, 1988). The management mindset emerged as the new state of mind. Uniform costing was considered doomed to failure due to the “difficulty of introducing the concept of objectivity in uniform costing”, drawbacks in the *sections homogènes* method due to the “complexity of accounting work”, a “grouping of expenses with the sole aim of facilitating allocation, with no focus on functional cause-and-effect relationships" (6th national congress of the French accountants’ body *Ordre des experts-comptables*, 1951).

The emissaries returned home after observing that “the companies visited had sacrificed precision for simplicity”, and praised the standard cost method, which they noted did not involve “particularly complicated or costly techniques”. However, one criticism was expressed regarding the method’s inappropriateness in a high-inflation period. As a result of the Korean War, France’s imported commodity prices had multiplied by 2.5 and the price of industrial products had risen by more than 70% by 1951! (Ambrosi, 1969, 212). In such a climate, analysis of price variance from standard would be irrelevant, whereas use and control of standards in workshop management (Chatzis, 1990) made it easier to determine equivalences. These were auspicious circumstances for a compromise in the form of a mixed method:

*“The difficulties of the traditional method, which it must be acknowledged is relatively costly, and the dangers of the standard-based method in our unfortunate country whose currency is highly unpredictable, have led practitioners to seek a third way. This third way is the mixed method, or more precisely mixed methods, which are countless.”* (Thibert, 1952, 9).

This mixed method was the stand-alone equivalence method of which the points method and the GP method are two examples. We have seen the economic and ideological causes that fostered the emergence of these methods, because the *“field of innovation does not only depend on the innovative subject”* (Simon, 2008, 111), but that does not mean that the role of the creators should be ignored[[47]](#endnote-47).

One of the equivalence-based stand-alone methods that appeared between 1950 and 1960, the points method, has no recognised parentage, but the other, the GP method, bears the initials of its creator, Georges Perrin, whose personality certainly contributed to the features of the method. Perrin, the son of an engineer who had trained at the *Ecole Centrale,* was himself a graduate of the same school. During the interwar period he occupied various factory managers’ positions in the textile and mechanical sectors. Drawing on his experience, he defined his own method for determining industrial costs: the “GP method”. He devoted the rest of his life to stubbornly disseminating and promoting his method, helped by his wife who continued his work[[48]](#endnote-48). The GP method contains a concern for precision in the allocation of common costs, combined with a neatness in the chosen solution that makes it easier to apply: these are the signs of a rational, pragmatic engineer.

**Conclusion**

The history of the allocation of common costs in France between 1914 and the 1950s illustrates the costing dilemma facing the manager: The need to strike a balance between precision, simplicity of application and theoretical complexity. During the First World War, the machine hour approach emerged in France and considerably improved the level of precision of the overall coefficient method. Subsequently, precision gradually came to take second place to simplicity of application, thanks to the equivalence methods - even if this meant complicating the method by calling on concepts such as homogeneity (Level 2) or hidden constancies (Level 3). This situation can be summed up in the following table:

|  |  |  |  |
| --- | --- | --- | --- |
| Emerging cost allocation method | Precision | Simplicity of allocation | Theoretical complexity |
| 1914-1928  Machine hour method | + + | \_ \_ | + |
| 1928-1936  *Sections homogènes* method  Level 2 Equivalence method | + | \_ | + + |
| 1936-1950  Cegos method  Level 2 Equivalence method | \_ | + | + |
| 1950-1960  Thibert / GP  Level 3 Equivalence method | \_ | + + | + + |

Can it be hypothesised that the common cost allocation method results from constant trade-offs between three variables, which, using the initial letters of each term (Result, Precision, Simplicity and Complexity), could be expressed R = P + S + C? If the equilibrium is to be maintained, any new method emerging to address a criticism aimed at one of these three components would reduce the importance of one of the others. This is observed in the four periods identified, in which a new solution emerges first through emulation (copying methods used in another country, or by a leader in the profession), then through a desire to assert national management, then due to political events, and finally ideological and/or economic events. We have also shown that choices can be influenced by logical determinism or action by specific individuals (Meurisse, Rimailho, Detoeuf, and Perrin). A cost allocation method appears to be the expression of an unstable equilibrium, resulting from the chronic dissatisfaction inherent in the tension between three forces; it is prone to change in response to an external event, whether economic, political, social or ideological, and relayed through the determination of one or more individuals.

While the search for invariance is often found in history, and is doubtless one of its missions, caution must be exercised, since “historical events have an irreducible richness and complexity, which makes enunciation of veritable laws improbable at least, due to the quantity of parameters involved in each situation” (Boyer, 1992, 23). In the historiography we claim to follow, the lessons of history are considered to help us take a more objective view when receiving innovations, guarding against fashions affecting *“the a-historical, engineering, problem-solving approach by means of mechanical models and devices”* (Hobsbawn, 1997, 47) of which costing is one. Naturally, the future is not a simple repetition of the past.

On the question of whether the pattern brought out here is valid for a different period from the one studied, we can only offer an intuitive response. Direct costing, which spread in France in the 1960s, continued the search for simplicity identified earlier, leading to greater imprecision in the allocation of common costs (since fixed costs are quite simply not taken into account), but greater simplicity. The next innovation in common costs allocation methods was the ABC method, which emerged in the 1990s in France; in contrast to the simplistic methods, this sought to regain precision in the allocation of indirect costs, but increased the administrative workload. Finally, the TD ABC method that has appeared in recent years has brought a return to equivalence methods and greater operational ease, at the price of higher theoretical complexity. This scenario appears to confirm our pattern, but these are currently no more than avenues for further investigation. Further research might examine the period from 1960 to today: It would be valuable to look beyond common costs and include cost variability, and broaden the scope beyond France to an international study.

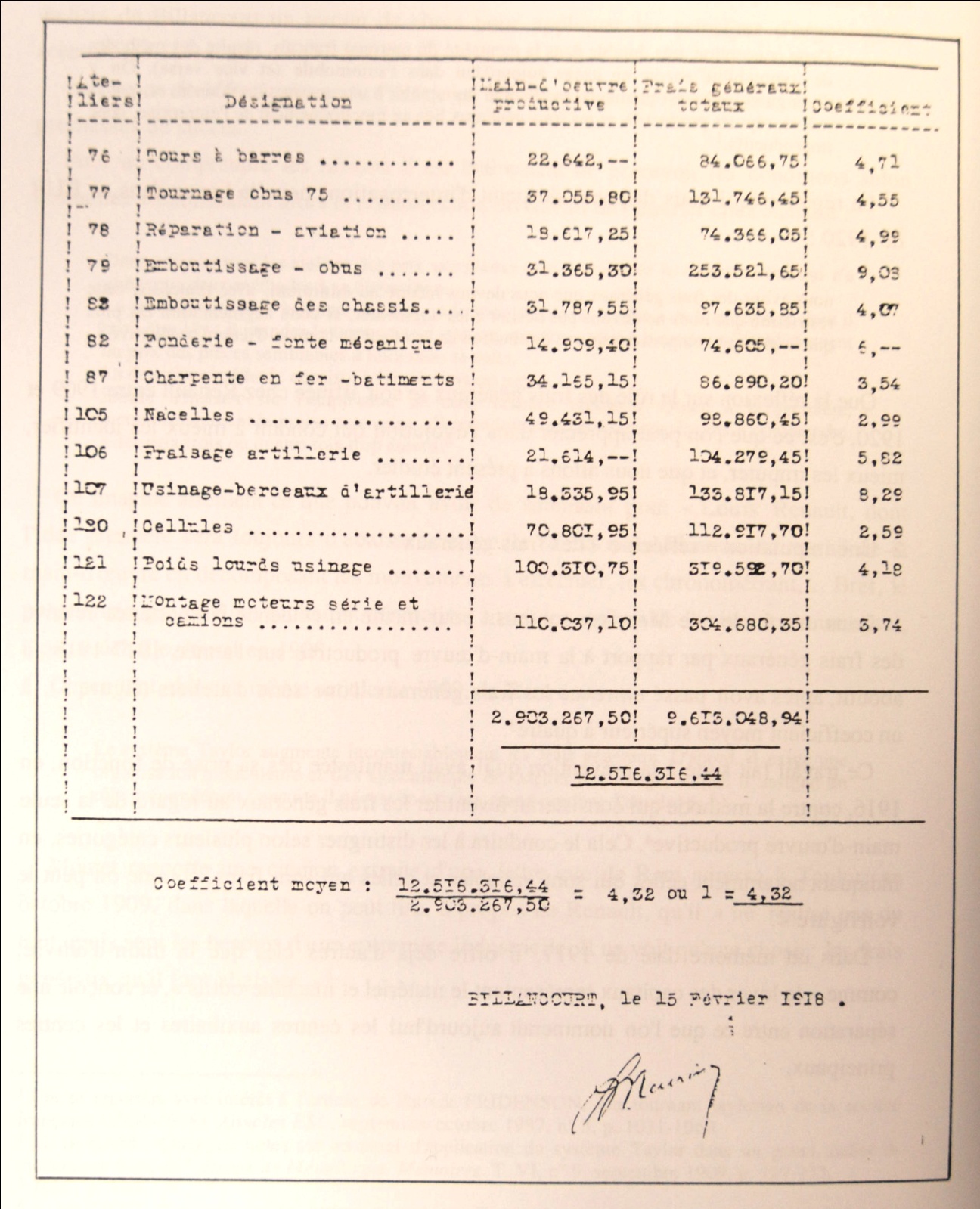


Figure 1.Meurisse report of February 15 (1918): *coefficients of overheads in relation to direct labour,* AN 91 AQ 39. Published in: Bulletin des Usines Renault, 1918, no.. 1, 17.

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1. In the English-language literature on costs, the terms “common costs”, “joint costs”, “burdens” and “overheads” are often used interchangeably, like the French terms “frais généraux” and “charges indirectes”, but ambiguities remain despite the many efforts made by a number of accounting authors (Zimnovitch, 1997a); in the rest of this article, no distinction will be made between these terms. [↑](#endnote-ref-1)
2. To restrict this study to costing during the period from 1914 to the 1950s, for further information the reader can consult, for example, Bhimani, (1993) on the introduction of scientific management in the Renault factories, Zimnovitch (1997a) on the appearance of standard costs in France, Dugdale and Jones (2003) on the appearance of direct costing in the UK between 1950 and 1975, Ahmed and Scapens (2000) on the emergence of uniform costing in the UK, Lemarchand (2002) on the French *sections homogènes* methods, Boyns, Matthews and Edwards (2004) on costing methods in the British chemical industry in the period 1870-1940, Fleischman, Boyns and Tyson (2008) who show the emergence of standard costs in the UK, as well as other authors. [↑](#endnote-ref-2)
3. This difference in perspective explains why this article does not look at the problem of rational allocation of fixed costs, even though J. M. Clark believed that “study of overhead cost will be largely a study of unused powers of production” (1923, 1). [↑](#endnote-ref-3)
4. All translations of quotations are the authors’ own. [↑](#endnote-ref-4)
5. Calling on epistemology for a technical question such as allocation of common costs may appear an exaggeration, but relatively speaking, the problem raised is linked to the issue defined by a number of philosophers of science; as one of them, René Thom, says: “*fundamentally, I believe that the scientific approach always relates to a central problem, a kind of founding aporia. Science seeks to solve this, finding solutions that after a certain time turn out to be fundamentally illusory. Then the process starts again, with a slight improvement, and we finally discover that this too is illusory, and so on. The fundamental problem remains, and with it the aporia…*” (2009, 69). This is confirmed by Paul Valéry: “*True science is not a system of answers. On the contrary, it is a system of problems that remain always open. The fundamental axioms of a science are the partial determinations of problems*.” (1973, 833). [↑](#endnote-ref-5)
6. The French *sections homogènes* method is a full costing method which handles indirect charges through cost centres. It resembles the German methods. For a history of the birth of this method, see Lemarchand (1998) and Bouquin (1997). In the rest of this article we use “homogeneous sections” or the original French name, which was the most commonly used name for the method during the period of observation. [↑](#endnote-ref-6)
7. Dissemination of a managerial innovation can be divided into two major phases: *knowledge*, understood as “*the process by which an innovation is communicated through certain channels over time among members of a social system*” (Rogers, 1995, 5), and then adoption, i.e. actual use of the innovation by businesses (Abrahamson, 1996, 1997). [↑](#endnote-ref-7)
8. The debates are more than simply academic. France’s first professors of Management Science were appointed in the 1970s, which was also the period in which the term “management science” (*science de gestion*) came into use. The debates also concern practitioners: accountants and consultants. [↑](#endnote-ref-8)
9. The *Centre de Perfectionnement aux Affaires de Paris* (CPA) is a private higher education establishment set up in 1929 by the Paris Chamber of Commerce and Industry to provide managerial and executive education and training. It is also one the main publishers of French-language case studies for teaching management in educational establishments and training senior staff. [↑](#endnote-ref-9)
10. A *Polytechnique*-educated industrialist (see note 26) and fervent supporter of Taylorism, Jean Coutrot was one of the most eccentric French engineers/managers of the inter-war period. [↑](#endnote-ref-10)
11. Georges Perrin was the inventor of the GP method. [↑](#endnote-ref-11)
12. The Cegos was originally an employers’ organisation, then in 1948 became a non-profit organisation and one of France’s leading training bodies. For a history of the Cegos, see Dard (1999). [↑](#endnote-ref-12)
13. In a costing system, a cost centre is a group formed in such a way that all expenses related to it can be reduced to one unit that can be used to measure, and allocate to each product, the share of costs actually attributable to that product. This makes it possible to respect the homogeneity of the costing system, under the “equiproportionality” system, i.e. all resources must be used in the same proportions for all activities, in order to avoid aggregation errors that arise when the aggregate cost of resources is consumed by cost objects in different proportions (Datar et Gupta, 1994, 568). [↑](#endnote-ref-13)
14. For example, Nusbaumer’s translation of the article by Gantt: “*Des relations entre la production et les dépenses d’une usine*”, Revue de la Métallurgie, 1915, 1066-1068. [↑](#endnote-ref-14)
15. HEC JF was a well-known business school at the time. These lectures must have made a mark, because Jean Milhaud refers to them in his book “*Chemins faisant*” (Milhaud, 1956, 122), claiming that they remain famous. [↑](#endnote-ref-15)
16. *Organisation scientifique du travail* [↑](#endnote-ref-16)
17. “The results, with no doctoring, will thus be absolutely official in nature and can be used for all justifications of price to the Army where relevant, which has some importance at the moment.”, Meurisse report of February 15 (1918), *“Coefficients de frais généraux 1917- 1918”*, AN 91 AQ 39. The problem of war profits was raised in France as early as 1915 (Touchelay, 2011). [↑](#endnote-ref-17)
18. Accounting organisation project dated June 1, 1916. AN 91 AQ 39. [↑](#endnote-ref-18)
19. The *Bulletin des Usines Renault* (a title reminiscent of Napoleon’s *Bulletin de la Grande Armée* published to report his battle victories…) was a bi-monthly first published on August 1, 1918. The first issue was devoted to common costs, and others were to follow (particularly N° 40, of March 1920 covering overheads in machining and assembly workshops). [↑](#endnote-ref-19)
20. Marius Berliet was attracted by the ideas of Taylor, and joined forces in 1915 with an English efficiency engineer Eggerton Banks, who was familiar with Scientific Management and particularly well aware of the issues at stake with common costs. The archives contain comments that echo the machine hour approach: “With modern machines, overheads can reach eight times the value of labour. It is thus dangerous to take the labour value as the basis […]. For each workshop or large group of similar machines, all the following hourly costs should be determined […]”. (Zimnovitch, 1997a, 145) [↑](#endnote-ref-20)
21. France’s Minister of Armament, Albert Thomas, was informed of these instructions before the war had even finished, as shown by a 3-page memo stored in his personal archives. But it was after the war that the State’s military establishments became interested in accurate costing through careful allocation of overheads, because they had to prove their competitiveness in relation to private industry, which had production facilities standing idle and was campaigning for an end to what it saw as unfair competition (Lemarchand, 2000). [↑](#endnote-ref-21)
22. The existence of similar systems in Germany suggests that this was not a purely American invention (Trossen, 1935, 79-86 , 188-190). There may even be doubts as to whether the term “invention” is apt for what looks more like a logical translation of an economic change related to the rise of a machinery-based approach by professionals sharing the same technical culture. [↑](#endnote-ref-22)
23. This method, called the “cost numbers method” and designed while he was working for Bethlehem Steel (Epstein, 1978), is reported for example by Atkins in the journal *Industrial Management* (Atkins, 1923). Keely described the method in a paper presented at the “Philadelphia meeting of the American Society of Mechanical Engineers” on February 8, 1913 and published in two professional journals (Keely, 1913a,b). Copley (1923) gave another account. [↑](#endnote-ref-23)
24. This shows that Taylor did not always use the direct labour hour as the work unit, even though he was in the habit of using it to allocate overheads. [↑](#endnote-ref-24)
25. The CGOST (*Commission Générale de l’OST – Organisation Scientifique du Travail* (Scientific Management commission) founded in 1926 was an employers’ organisation that became the Cegos in 1936. [↑](#endnote-ref-25)
26. The *École Polytechnique*, founded in [1794](http://fr.wikipedia.org/wiki/1794), is France’s most prestigious engineering school. [↑](#endnote-ref-26)
27. Principally of the CGCEM, a railway equipment production and repair company. For a biography of Rimailho, see Lemarchand, 1998. [↑](#endnote-ref-27)
28. While Rimailho can be classified as a Taylorian engineer (Moutet, 1997, 34), he claimed that Taylor had simply adopted the methods applied by French arms manufacturers. [↑](#endnote-ref-28)
29. Social Catholicism is a doctrine that appeared after the French Revolution, early in the industrial revolution. Its aim was to promote a social policy in line with Church teaching, or even to build a new humanist society on a Christian basis, opposed to economic liberalism. [↑](#endnote-ref-29)
30. Jean Jacques Émile Cheysson, ([1836](http://fr.wikipedia.org/wiki/1836)-[1910](http://fr.wikipedia.org/wiki/1910)), a French engineer, academic and social reformer. After graduating from the *Ecole Polytechnique*, he managed the steelworks at Le Creusot, then became a professor of political and social economics at the [*École Libre des Sciences Politiques*](http://fr.wikipedia.org/wiki/%C3%89cole_libre_des_sciences_politiques) and professor of industrial economics at the [*École des Mines*](http://fr.wikipedia.org/wiki/%C3%89cole_nationale_sup%C3%A9rieure_des_mines_de_Paris). [↑](#endnote-ref-30)
31. "Le rôle social de l'ingénieur", *La réforme sociale*, October 1, 1897, cited by André Thépot (1979, 238). [↑](#endnote-ref-31)
32. “Rationalisation : dans quelle mesure adapter la formule américaine à l’industrie française, Exposé du Colonel Rimailho”, *Comité National d’Etudes économiques et politiques*, meeting summaries, Meeting no. 410, December, 16 (1929). Cited by Lemarchand (1998). [↑](#endnote-ref-32)
33. Hyacinthe Dubreuil (1883-1971), labourer’s son and trade-unionist, recommended creating economically and financially autonomous workshops to encourage training in labour management. He believed that this would give the worker the means of fulfilment on three levels: economic, intellectual and moral, without which social harmony would always be unattainable. In 1936 he published a book on the Bat’a experiment: *L’exemple Bat’a, la libération des initiatives individuelles dans une entreprise géante* (Dubreuil, 1936). [↑](#endnote-ref-33)
34. *Une méthode uniforme d’établissement des prix de revient.* [↑](#endnote-ref-34)
35. This change was adopted by the Cegos. [↑](#endnote-ref-35)
36. The organisation committees were the basic structure of the planned economy introduced by the Vichy government from 1940. They were formed to take a census of companies, stocks, and labour, develop production programmes and propose sale prices. [↑](#endnote-ref-36)
37. 35 In a further step away from Rimailho’s ideas, the 1982 *Plan comptable* (PCG), the last to include management accounting, divides the company into “Cost centres” corresponding to functional entities, which may be split into Sections if the centres have several activities. [↑](#endnote-ref-37)
38. He also discussed the problem that was to return later in equivalence methods: the stability of this homogeneity, in other words the conditions for maintaining these methods: “we are forming a homogeneous team, whose stability may vary from one order to another” (Rimailho, 1939, 139). [↑](#endnote-ref-38)
39. When heading the costing commission launched by the Cegos in 1928, Rimailho wrote: “*for us, the primary value of knowledge of [cost prices] is the technical lessons. Nonetheless it will be used in setting sale prices*.” (1928, 22). Five years later, when the Cegos launched a new commission on the subject, again headed by

    Rimailho, the technical function was even stronger, to the detriment of sale price decision support, as noted in this memo written by one of the members of the commission, business manager M. Landauer: “*the cost price cannot be used to set sale prices, what can its role be? A scientifically established cost price is the most reliable and almost the only instrument of management control*”. Renault’s representative M. Lapiquonne went further, adding: “*If the cost price is of primordial importance to industry, it is not because it can be used to set the sale price, [but because it can be used] to determine ongoing progress in the business*.” (Archives J. Coutrot, AN 468 AP 3, dossier no. 6). [↑](#endnote-ref-39)
40. The compulsory aspect of the costing method first appeared in 1939 for companies working for the National Defence (Zimnovitch, 1997b, 23). [↑](#endnote-ref-40)
41. The *Conservatoire National des Arts et Métiers* (CNAM) is a prestigious French management school, founded in 1794. [↑](#endnote-ref-41)
42. The method’s validity is based on the principle of “hidden constancies”. Whatever the variations in unit prices, the relationships between consumptions resulting from elementary operations remain constant over time. [↑](#endnote-ref-42)
43. In each period, the UVA (value added unit) cost is determined based on all costs in the accounts for the period. If C is the amount of costs stated in the accounts, A the amount of purchases incorporated into the products, D the amount of customer-specific expenses and *Quva* the value added produced over the period, then: *UVA cost* = . [↑](#endnote-ref-43)
44. Wires and Cablemakers union, CPA OF 3619 and OF 3889. [↑](#endnote-ref-44)
45. CPA case study OF 3889, p.2. [↑](#endnote-ref-45)
46. CPA case study OF 3889, Discussion, p. 1. [↑](#endnote-ref-46)
47. The spread of management accounting innovations can be understood from several perspectives. The influence of economic aspects, the role of individuals, but also the influence of networks of actors. This last approach stresses the interests of vartious groups of human and non-human actors, and has been applied to understand how the GP and ABC methods spread (Alcouffe et *alii*, 2007). [↑](#endnote-ref-47)
48. She took charge of posthumous publication of his works presenting the GP method (Perrin, 1962). [↑](#endnote-ref-48)