

June 2003

**Operating Rules in an Organisation: A Challenge to the Incentive
Theory**

Bénédicte Reynaud

(Proposal for *Organization Science*)

National Center of Scientific Research (CNRS) France
Ecole normale supérieure
48, bd. Jourdan
75014 Paris, France
Tel : 33- 1- 43- 13- 62- 52
e-mail : benedicte.reynaud@cepremap.ens.fr

Operating Rules in an Organisation: A Challenge to the Incentive Theory

(Summary)

In the standard economic model, individuals are intent primarily on following their own interests, which perhaps involves following rules. Those individuals who are following or are applying the rules, mean they are complying with a constraint on their utility maximization plan. Such a constraint helps to make the rule compatible with individual interests. Moreover, the rules are regarded as instruments that can align the particular interests of the members of the same organization. Such rules complete employment contracts, since theorists assume that they are applied mechanically. Incentive theory is undoubtedly the approach that has most explicitly developed this notion of rules (Holmström, 1979; Grossman and Hart, 1986). According to this theory, rules produce the same results wherever they are applied. This reason for this, it is said, is that they are implemented mechanically by actors who are assumed to be identical and within groups that exist only through the temporary interaction of individuals. The Electronic Equipment Maintenance Workshop (AME) of the Paris Metro offers particularly fertile ground for investigating the relevance of incentive theory. This workshop introduced a team productivity bonus still 1992. This is sufficient time for us to be able to take stock and bring our investigation to a successful conclusion. The field study and the method are presented respectively in the first and the second part of the paper. Subsequent statistical analysis of the evolution of labour productivity and of work quality indicators

(debt levels and fault recurrence rates) among the AME production teams and examination of the amendments to the team contracts produce one main finding: teams adopt different strategies in order to obtain maximum bonus payments. This is reflected in their dissimilar records in terms of productivity gains, improvements in work quality and group dynamics (part 3). The final part is devoted to the main implications of the analysis: Firstly, labour productivity emerges as a negotiated variable that is a collective construction. Second, the bonus scheme, which was initially conceived as an incentive scheme or a rule to encourage increases in labour productivity, has probably not produced all the effects, at an aggregated level, that its advocates were hoping for. Third, an explanation of the latter result is provided, grounded on Wittgenstein's conception of rules.

In the standard economic model, individuals are intent primarily on following their own interests, which perhaps involves following rules.¹ But what do we mean when we say that those individuals are following or are applying the rules? In effect, they are complying with a constraint on their utility maximization plan. Such a constraint helps to make the rule compatible with individual interests. Moreover, the rules are regarded as instruments that can align the particular interests of the members of the same organization. Such rules complete employment contracts, since theorists assume that they are applied mechanically. Incentive theory is undoubtedly the approach that has most explicitly developed this notion of rules (Holmström, 1979; Grossman and Hart, 1986). According to this theory, rules produce the same results wherever they are applied. This reason for this, it is said, is that they are implemented mechanically by actors who are assumed to be identical and within groups that exist only through the temporary interaction of individuals. When this is not the case, the only possible explanation must lie in the fact that the groups being compared (work teams) are not comparable, primarily because their technical and individual characteristics are too heterogeneous².

The Electronic Equipment Maintenance Workshop (AME) of the Paris Metro offers particularly fertile ground for investigating the relevance of incen-

¹ This question is examined in detail by Vanberg (1994).

² In Reynaud (2002), I have demonstrated that the teams are comparable and that the exogenous shocks, if there were any, have been neutralized by certain rules governing the management of the DEC.

tive theory. Such opportunities are rare indeed, since organizations seldom keep data such as those kept by AME over such a long period. Eight years have now elapsed since the introduction of the team productivity bonus scheme, or DEC to use its French acronym; this is sufficient time for us to be able to take stock and bring our investigation to a successful conclusion. The field study and the method are presented respectively in the first and the second part of the paper. Subsequent statistical analysis of the evolution of labour productivity and of work quality indicators (defect levels and fault recurrence rates) among the AME production teams and examination of the amendments to the team contracts produce one main finding: teams adopt different strategies in order to obtain maximum bonus payments. This is reflected in their dissimilar records in terms of productivity gains, improvements in work quality and group dynamics (part 3). The final part is devoted to the main implications of the analysis: Firstly, labour productivity emerges as a negotiated variable that is a collective construction. Second, the bonus scheme, which was initially conceived as an incentive scheme or a rule to encourage increases in labour productivity, has probably not produced all the effects, at an aggregated level, that its advocates were hoping for. Third, an explanation of the latter result is provided, grounded on Wittgenstein's conception of rules.

1. The field study

1.1. The salary rule and its context

The field study is a workshop of the parisian Métro, l'Atelier de Maintenance des Equipements Electroniques (AME) which has in charge the electronic

maintenance of the metro network of the RATP (the french transport authority).

In December 1991, the Rail Rolling Stock management and all the trade unions, with the exception of the Confédération Générale des Travailleurs (CGT), signed a '*Trial Agreement on a Team Efficiency Improvement Scheme*' (known in French as the DEC Agreement, after its French name: '*Convention d'Expérimentation de la Démarche d'Efficacité Collective*'). This agreement laid down the general principles governing the pay rule. The production targets laid down in the DEC Agreement increased work intensity by reducing the difference between statutory and actual working times. The explicit objective was to improve team '*efficiency*' by '*producing output of a good level in terms of both quantity and quality*'.

Quantitative and qualitative indicators enter in the composition of the bonus. The quantitative indicator is maximal if the team reaches an output equating to a working time of 6.50h, which is the statutory time; the quantitative indicator is null if the team reaches only an output equating to a work time of 5.42h, which is the mean working time at the Railways Department (MRF). The bonus varies proportionally between these two limits. The team productivity bonus was to be paid in proportion to each team's collective results up to a certain threshold and at a flat rate above that level (*cf.* Annex 1. The minimum and maximum DEC ratios).

The other half of the bonus depends on two indicators: The fault recurrence rate and the debts. The fault recurrence rate which is defined by the ratio of the number of units withdrawn again within six months of repair to the number of units received for repair, contains a bias, since a piece of equipment may be re-installed on a train well after the fateful six months, sometimes as much as two years later. However, this does not prevent the fault recurrence rate being monitored over a given period. The other indicator relates to internal quality, measured on the basis of the level of *debts* to the logistics department. In other words, the rule penalizes a team's failure to meet the deadlines laid down in the *debt sheets*. It is not easy to use these criteria in order to define the level of quality to be achieved. For example, operatives knew that some capacitors were reckoned to have reached the end of their useful life after 15 years. Since all the equipment had been in use for more than 15 years, operatives might well have considered it reasonable to take advantage of the repairs being carried out to change the capacitors, albeit at the cost of extending repair times, which would be reflected in *debts* and a lower internal quality grade. It is not a simple matter to decide how far to go in making these changes and where the dividing line between preventive and corrective maintenance lies.

The team productivity bonus was to be shared equally among team members and to be paid every six months. The team contracts, concluded be-

tween the supervisor responsible for the team and management, committed operatives for periods of three years and could be renewed.

Finally, the bonus was to be paid only to those operatives who volunteered to participate in the scheme. It is important to note that voluntary participation is a way of short-circuiting collective bargaining within the workshop itself.

1.2. One of the origins of the rule: The strike of 1988

In 1988, the RATP had just been through a period of industrial unrest, with a strike lasting about a month in the MRF department, and particularly in the AME, which had finished by paralysing the Metro. The dispute was in essence a protest by maintenance workers against the seemingly much more favourable conditions enjoyed by operatives (drivers and mechanics), including a lower retirement age and higher pay. The reason for the pay differential lay less in the bonuses paid to operatives in recognition of their difficult working conditions than in a specific mode of labour management applied to operatives, whose potential for taking strike action the RATP had always feared. From this perspective, the DEC Agreement, while it was undoubtedly part of the authority's modernization project, can also be seen as one of the instruments deployed to reduce the pay gap between train crews and other workers while at the same time providing an acceptable justification for it, one that would not trigger a similar demand on the part of operatives.

The DEC was not introduced into the workshop in order to resolve a serious labour productivity problem. In 1990, indeed, the workshop was on an upward trajectory in terms of productivity and efficiency compared with other MRF units. In terms of openness and ability to change, the workshop is one of the few units to maintain external contacts, working with suppliers Alstom and Matra. This openness to the outside world is an incentive.

2. Method and data gathering

2.1. Method

I observed the development of the new pay rule and its implications over a lengthy period, from its introduction in July/August 1992 until June 2001. Shortly after its introduction, between February and April 1993, I conducted some 35 interviews with operatives, supervisors, shop stewards and management. As far as possible, the interviews with the operatives were held at their workstations, which enabled me to gain a better understanding of the actual work situations. I also had at my disposal a number of documents made available to me by management that enabled me to study how the rule had been produced. In November and December 1994, I returned to the maintenance workshop with an ergonomist from the National Agency for the Improvement of Working Conditions (ANACT) in order to investigate the effects of the new pay rule on the team dynamics a little less than two years after my first

interviews.³ Having obtained the agreement of management, unions and operatives on the objectives and method of the study, we set to work not by interviewing employees but by observing operatives at work. By agreement with management, we observed three teams, each working with a different technology (control electronics, power electronics and micromechanics). In a brief period of immersion in each team's activities, during which our working day extended over the longest time slot worked by the operatives, we observed them at work and questioned them about what they were doing, how and why, in what order, etc. Our attention was concentrated on the nature of the cooperation between the operatives, on the methods of task selection and on the strategies adopted in order to secure the maximum bonus. The reports and our observations were subsequently shown to the operatives and validated by them and then handed to management. Finally, between September 2000 and June 2001, I returned to the workshop with the aim of analyzing the consequences of the pay rule for labour productivity. I expended considerable time and effort on reconstituting monthly statistical series on each team's productivity and work quality between November 1992 and December 2000. While I was engaged in this task, I conducted numerous interviews with the director of AME.⁴

³ Part of the present study is based on the work I did with Anne Flottès, an ergonomist working for the National Agency for the Improvement of Working Conditions at the time the interviews were conducted.

⁴ It so happens that the workshop manager in 2000-2001, who had returned a year previously to take up his post, was one of the engineers who, in 1993, was charged with the task of implementing the new pay rule.

2.2. Reconstituting a monthly database for each team (November 1992-October 2000)

In order to analyze the effects of adding a new rule to an existing rule system, it was necessary to reconstitute a monthly database depicting the evolution over time of the various teams. This had to be done by using the current AME database, in which data is recorded in accordance with the current structure. Starting from the most recent period, production figures since the time the database was first set up (1994-95) were reconstituted as if the structure of the current teams had never changed, using the most recent weighting coefficients. The idea underlying this approach is to process the data as if the technical structure had remained unchanged in such a way that one weighted output units⁵ (WOU) is always equal to one hour's work. The AME database uses current weighting coefficients to reconstitute the output and productivity series for each team broken down into its various current basic production units (BPUs). With this approach, the notion of team loses its meaning, since any sense of evolution over time, reflecting changes in each team's remit as activities are transferred between teams, is jettisoned.

In order to reconstitute the evolution of the teams over time, it was necessarily, firstly, to reconstitute their remits and, using the non-weighted

⁵ The introduction of the productivity bonus gave rise to a need to create some sort of equivalence between the procedures carried out by the various teams. This is why the 'weighting coefficient' was devised; it is defined, for each BOU and for each type of corrective and preventive procedure, as the average number of hours required per procedure. This ratio has been recorded in the AME database since 1991. Thus each procedure, modified by its coefficient, is equivalent to n 'weighted output units' (WOUs), in which n is the weighting coefficient.

output figures contained in the current AME file, to calculate the monthly WOU's by seeking out each BPU'S weighting coefficients and the changes to them, as detailed in the amendments to the team contracts. I carried out this work for all the teams, with the exception of the relays teams, whose computer files disappeared when the team transferred to the Sucy site in March 1999. Secondly, it was necessary to reconstitute debt levels and fault recurrence rates, potentially with a few possible errors.

For the period prior to 1995, I drew on a file containing data on all the teams for the year 1993 and on graphical data on the productivity bonus results, which I had kept since my first two visits to the AME. Nevertheless, there is a six-month period for which I was unable to find data (November 1994-April 1995).

Taking these monthly figures (November 1992-October 2000) as a starting point, I calculated the quarterly figures corresponding to the bonus payment periods. The two databases contain virtually the same indicators: output as measured by the number of WOU's, labour productivity in volume terms, debt levels and fault recurrence rates; the quarterly database also contains the percentage of the maximum bonus obtained by each team at the end of each bonus period. The other important source of information on which I was able to draw relates to the legal aspects of the bonus scheme: the original team contracts, the revisions negotiated at three-yearly intervals and all the amendments negotiated between the production manager and each team supervisor.

Since the results obtained before the amendments were negotiated had not been recorded by AME, it proved impossible to measure the effect of an amendment on the level of bonus obtained. Nevertheless, there are a few examples drawn from direct observations between the months of October and November 1994 or taken from annexes to the amendments.

It was obviously necessary to reconstitute these data for all the teams in order to assess the degree of diversity within the results as a whole, in terms of both productivity and work quality. However, it also enabled us to define the parameters for the three teams whose strategies I examined in detail (EK1, EK3 and the micromechanics team)⁶.

However, statistical analysis taken in isolation reveals nothing about the strategies adopted by operatives in order to obtain the maximum bonus. Those strategies can be reconstituted by eliminating those that are incompatible with certain results and by comparing them with different data. Thus the statistical analysis has to be supplemented with data on changes to the rules governing the team productivity bonus scheme, and particularly to the weighting coefficients and to the upper limits on debts and fault recurrence rates as detailed in amendments to the team contracts, as well as with information on the management style adopted by the supervisors who took over as heads of the various teams.

⁶ In this paper, however, I only present the results related to EK1 and EK3. See Reynaud (2002).

3. The teams' strategies

3.1. Towards a strategy of permanent renegotiation of results (EK1)

In a first period, the teams adopted the same strategy: the operatives selected those procedures that minimized the time spent on each repair, in such a way as to maximize output. In the Electronic team number 1 (EK1), the operatives gave priority to the easiest procedures, those that generated the most 'weighted output units'. Among the corrective procedures, this meant giving priority to single circuit boards rather than whole units, etc. In the case of procedures involving parts with intermittent faults, there is a high risk that operatives will simply label them NTR (nothing to report) after a cursory examination, without carrying out the necessary tests, and that this will have obvious repercussions on the fault recurrence rate (any part labelled NTR is entered in the operating account as one WOU).⁷

Obviously, the preference for procedures that generated WOUs in a minimal time is not always compatible with quality standards, whether external (fault recurrence rates) or internal (debt levels). Firstly, a productivist strategy can reduce the reliability of repairs, particularly when the equipment is ageing. The fault recurrence rate rises very sharply, which leads to massive indebtedness. Indeed, debt levels and the fault recurrence rate are very closely correlated. Secondly, maximization of the WOUs is not necessarily compatible with adherence to the priorities detailed on the *debt sheets*. This may be the

second factor that contributed to the massive indebtedness from May 1994 onwards; debts reached an initial peak in October 1995 and the team found itself in a critical situation. After six months' work in October 1995, it was only 2.6 per cent above the minimum DEC threshold. It was evident that this policy could not be pursued indefinitely: ultimately, it would be the trains that ground to a halt. This is why, from the end of October 1995 onwards there was a change of direction.

It was the supervisor who negotiated the level of the bonus payment with management. The latter embarked upon a process of *debt discharge or neutralization*,⁸ which led to the production manager and the supervisor reaching agreement on an amendment to the team contract that made it possible to pay 92 per cent of the bonus. The following commentary can be read on the output chart displayed at the entrance to the team's work area: '*Debts written off for this period because of the MF 77 circuit reconditioning campaign*'. This marked the beginning of the team's policy of systematically negotiating amendments to their DEC contract.

The episode of October and November 1995 seems to have opened the way for a different strategy, which involved bargaining over the results for the six months that had just finished (period $t-1$) and then using the negotiating results as the basis for calculating the productivity bonus to be paid in period t .

⁷ The question of the NTRs was mentioned several times by the operatives during the interviews conducted in 1993.

⁸ These are the terms used by management.

And indeed, EK1 is the team that has concluded that most amendments since the introduction of the productivity bonus scheme, a total of 16 between 1993 and the year 2000, an average of one every six months.

At this stage, there is some value in outlining the various strategies adopted by the teams as reflected in the provisions of the amendments they negotiated. Some of these agreements constitute decisions to revise the rules laid down in the DEC agreement, while others invoke decisions, in the legal sense of the term, that are concrete, categorical and non-permanent. Some of these decisions adjust a team's past results, while others, anticipating poor results in the future, adjust them in $t+1$, $t+2$, and so on. Decisions to revise the rules do not have the same implications as decisions to modify the past or the future, particularly when it comes to the degree of credibility attached to the bonus scheme.

These differences, which serve to locate the strategy adopted by EK1, are summarized in Table 1 below. The table is based on an examination of all the amendments concluded in the OF AME, the aim of which was to classify them on the basis of various criteria. What was modified? For what reasons? Who were the team supervisor and the production manager when the amendment was signed? Does the amendment constitute a decision to revise the rule or does it invoke a decision? Does this decision relate to the past or the future?

Table 1. Decisions and revisions of rules in amendments to the DEC agreement (1992 - 2000)⁹

	Past	Future	No. of amendments 1992-2000
Teams	No. of decisions adjusting the result of the DEC in t-1, t-2	No. of decisions to revise the rule	
EK1	16	0	16
EK2	4	2	6
EK3	2	5	7
EK4 (from late 1996 to 2000)	2 ½	5 ½	8
Micromechanics	2	5	7
Relays (1992-March 1999)	0	2	2
Total	26 ½	19 ½	46

All the amendments negotiated by EK1 are decisions which break down the rule by a change of the results of the previous period, particularly the level of debts. The method involves allowing exceptions to the results that count towards the calculation of the productivity bonus. Decisions are formulated with phrases such as: 'debts must be adjusted as follows...'. Notice that the

⁹ The fractions in this table may seem surprising ; in reality, for those amendments that have two sections, one relating to the past and the other to the future, we have allocated a weighting equal to ½ to each con-

strategy which consists in using of decisions instead of applying the existing rule, has important practical consequences. In order to understand this point, the differences between rules and decisions are to be presented.

In general terms, rules can be said to be explicit, public statements that trigger an action with a certain degree of predictability but do not determine it (except in the extreme case of a constraining rule). They are both general and abstract. If this is an observation that has to be made, despite its being shared by the legal community¹⁰, we do so in order to draw a conclusion that is perhaps less banal: the distance between rule and solution is a fundamental property of rules, since it explains why a rule has always to be interpreted. Rules do indeed make it possible to find a solution to a problem, but they do not provide that solution in any detail. Rule is a framework that guides behaviour. *'If the content of the rule corresponded exactly to the actual hypothesis, the prescription would be valid only for the very limited number of hypotheses expressly considered. Even the slightest difference in circumstances would make it impossible to infer the solution from the rule'* (Atias, 1982: 216). Otherwise, there would have to be as many rules as there are problems to be solved, which would destroy the specificity of individual rules. We would then be dealing with another category, which in law, is known as a decision: *'It uses up its effect in an instant even though its consequences may be lasting. In contrast to norms (or rules), which can be applied in a limitless number of cases through the ef-*

figuration.

fect of a single edict, decisions exert their effects only step by step' (Jeammaud and Lyon-Caen, 1982: 57). March, Schulz & Zhou (2000: 23) share this point. They claim that: *'Rules are generic; situations are specific. Any particular situation has a number of different interpretations and may evoke a number of different identities with different rules.'* The interpretation, not in an hermeneutical sense, but in the play of the application of rules, is coextensive with the notion of rule. The indeterminacy of rules is the term used to denote this property.

EK1 is the only team that has more or less systematically modified its actual results; finally, the amendments concluded since 1998 have led to the team being paid the maximum bonus.

One fundamental and probably unusual conclusion emerges from this analysis: the bonus paid always equates to an actual daily working time of 6 hours 50 minutes (such as at EK1) but not necessarily to an increase in labour productivity. On the one hand, the negotiation of amendments has the effect of decoupling actual results from the awarding of the bonus. Bonus payments have remained fairly stable, always close to the maximum, when compared with the evolution of the various indicators determining them. On the other hand, the DEC, which was initially supposed to be a rule to be applied on the basis of

¹⁰ Cf. Hart (1960)

team results, gradually became a negotiable rule. It is the product of a battle of wills between the production manager and the team supervisor.

3.2. The strategy of revisions of the rules and the introduction of conditional rules (EK3: 1997-2000)

Such as in the team EK1, during the first phase (1993- 1996), EK3 adopted a strategy of maximisation of the output, which led to limits: an increase of the fault recurrence rate and, as a consequence, an increase of the debts.

The second phase, which lasted from April 1997 until October 2000, saw the emergence of a new policy on amendments. Under the influence of a new supervisor, the purpose of the amendments underwent radical change. In contrast to the first two amendments concluded on 9 May 1996 and 17 April 1997, the next five amendments anticipated a future difficulty by introducing rules that were conditional on a particular event, usually relating to the availability of a missing component. The supply problems that began to make themselves felt from 1996 onwards stemmed from the fact that suppliers were working on a just-in-time basis, which extended delivery times from four to six months.¹¹ The change the supervisor introduced was a fundamental one. Unlike decisions, whose effects make themselves felt in a specific and different way each time and are exhausted once enacted, rules modify the context within which work is

¹¹ Discussion with the supervisor in charge of this team.

organized and the conditions under which the bonus is obtained, thereby opening up a space within which choices can be made.

The put in place a *predictive maintenance system* based on a detailed analysis of the history of each unit sent for corrective maintenance. As a result, components were replaced before they failed. The data on the damage to each unit gathered in this way could also be used to predict, to some extent, future demand for components so that they could be ordered in advance.

This team adopted a somewhat different strategy from that adopted by EK1. The maximum bonus can never be obtained by recourse to just a single strategy, since each one comes up against the limits imposed by the DEC rule system. The strategy of maximizing labour productivity by concentrating on procedures that take little time comes into conflict with the rule imposed by the debt sheet and telephone calls from the line operators. There was a shift of strategy in order to give priority to clients' needs while at the same time maximizing the productivity bonus, the solution being to concentrate on *debts caused by non-recurrent faults*. The most effective way of achieving the maximum bonus seems to be to find the correct balance between the constraints imposed by the various rules. The supervisor was also obliged to engage in these manoeuvres with the rules. Firstly, in return for the action on debt reduction, he managed to obtain changes to the rules governing the three possible levers: the output weighting coefficient and revisions of the debt schedules and of the fault recurrence rates. Secondly, he innovated by introducing condi-

tional rules. However, the opportunity to make these changes depended to a large extent on the balance of power between the production manager and the supervisor, and on the latter's credibility.

4. Implications

Three conclusions can be drawn from a comparison of the teams' performance as measured in statistical terms with the amendments to the team contracts, the triennial reviews of the contracts and the percentage of the bonus obtained. Firstly, there is dissociation between productivity gains and payment of the bonus, since operatives can obtain the maximum payment without their productivity figures being at the required level. As a consequence, the labour productivity becomes a negotiated variable. Secondly, the DEC productivity bonus scheme has not fulfilled all the objectives its advocates were initially seeking, since there has been a marked slowdown in labour productivity growth since 1992, although it cannot be proved that the introduction of the DEC is one of the reasons for this. Thirdly, in our view, this result has an interpretation in terms of Wittgenstein's conception of rules.

4.1. Productivity becomes a negotiated variable

The first finding - that of dissociation between the teams' actual performance and payment of the maximum bonus - means that *labour productivity has ceased to be an actually observed ratio (between the volume of output and actual working time) and has become a collective construct*. This policy started in November 1994 at the time of the dispute within team EK1. In retrospect, it

would seem that it was the first step towards a *negotiated approach to the management* of the DEC bonus scheme, an approach that spread gradually and unevenly within the AME over the course of the following year. A proliferation of amendments to team contracts and changes to the weighting coefficients are the main instruments used in this negotiated management of the DEC, even though the latter were conceived and deployed as a means of preventing teams from being penalized by exogenous shocks for which operatives are not themselves responsible (technical problems, difficulties in obtaining the components required for repairs, and so on). Thus the supervisors use the results produced by application of the rules as a basis for renegotiating their teams' contracts and putting forward amendments of their own. Among the variables that are the object of negotiation, the one that directly affects productivity levels (upwards or downwards) is the weighting coefficient. In effect, the level of the coefficient depends on the supervisor's ability to justify his request for change, and hence on the balance of power between management and supervisor. In this perspective, the slowdown in labour productivity (1992 - 1995) and the recovery 1995 onwards are better understood.

4.2. The slowdown in labour productivity following the introduction of the team productivity bonus

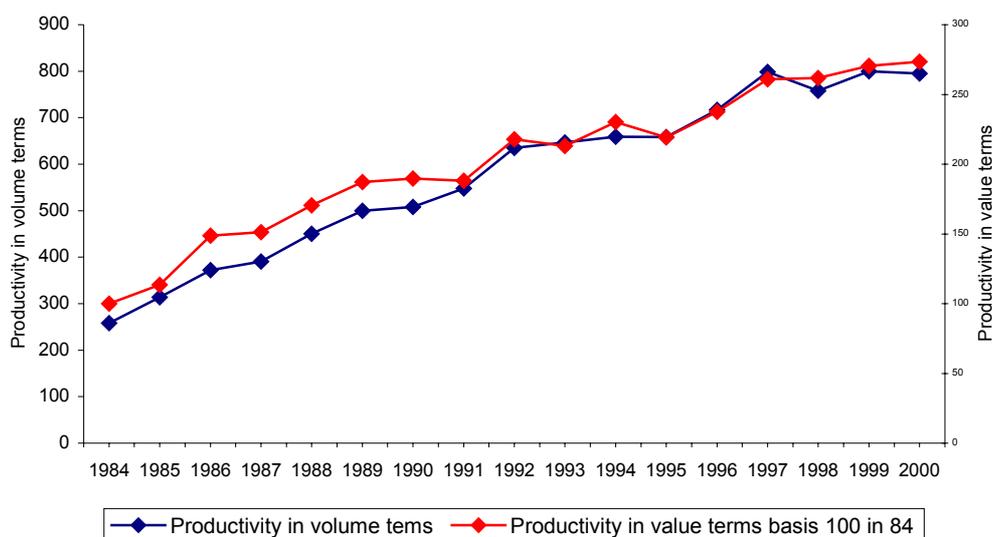
Labour productivity, measured in volume terms as the number of WOUs produced per operative over a 12-month period,¹² does not increase at the

¹² Productivity in value terms is defined by the following ratio: WOU for the entire Saint-Ouen site/average annual size of workforce. As is clear from Figure 1, the evolution of productivity in value terms is much the same as that of productivity measured in volume terms.

same rate before and after the introduction of the DEC. Between 1984 and 2000, the annual rate of growth in labour productivity was + 7.3 per cent; however, the rate was much higher in the period preceding the introduction of the bonus than afterwards. From 1984 to 1992, it was + 11.9 per cent per annum, while from 1992 to 2000, it fell to +2.8 per cent per annum (Figure 1).

Figure 1. Evolution of labour productivity in volume and value terms in AME:

1984-2000



In particular, in the three years following the introduction of the DEC (1992-95), labour productivity stagnated (+ 1.2 per cent per annum). The period 1995-2000 saw an improvement (+3.8 per cent per annum), despite the mediocre results for the year 2000 (- 0.65 per cent).

These results have one explanation. From 1992 to 1995, a real effort is required to operatives without concession. The improvement from 1995 on-

wards reflects a different mode of managing the DEC, grounded on the signature of amendments: either in order to revise the results obtained, or to do some conditional revisions. Of the 46 amendments to the team contracts negotiated since the introduction of the DEC, no fewer than 24 were added during a short period of time between November 1997 and April 1999. In any event, we will hypothesize that the year 1995 marked a turning point, towards a negotiated management of the DEC, which was more realistic and took greater account of the economic constraints.

4.3. Why incentive theory does not work ?

Incentive theory assumes that all individuals react in the same way when they have to follow a rule because they are acting far from the social world.

On the opposite, we have ascertained that teams applying what, *in formal terms, is the same rule adopt different strategies*. As a consequence, rules do not apply in a mechanistic way. They are transformed by those who are applying them. This finding will surprise all those scholars, such as incentive theorists, who take the view that rules stamp their meaning on practices. It was long after its introduction that the DEC acquired its meaning through the usages and practices of the individual teams and of management. Rules produce effects through the interpretations put upon them and the strategies to which they give rise in a given institutional context. Rules do not have any meaning in themselves; *rather the meaning of rules lies in their uses*. This conclusion

meets Wittgenstein's analyses of rules. As soon as the interpretation of a rule involves '*the substitution of one expression of the rule for another*' (PU, § 201), the result is that '*interpretations by themselves do not determine meaning*' (PU, § 198). And conversely, '*We do not extract rules from meaning, as if meaning were an object in space lying concealed behind the word. Meaning is not a crystal that is then dissolved in grammar*' (Dictées: 82). Rules are comparable to the words in a language in that they presuppose a practice (PU, § 43): '*The meaning of a word is its use in the language*'. It is use that gives meaning to rules and individuals' strategies that give substance to practices.

References

- Atias, C. (1982), 'Quelle positivité ? Quelle notion de droit ?' In *Archives de Philosophie du Droit*, 27: 209-233.
- Cyert, R. M. & March, J. (1963), *A Behavioral Theory of the Firm*. Englewood Cliffs, Prentice Hall.
- Grossman, S., & Hart, O. (1986), "The Costs and Benefits of Ownership: A Theory of Vertical Integration". In *Journal of Political Economy*. 94: 691-719.
- Hart, H. (1961), *The Concept of Law*. London: Oxford University Press.
- Hirschman, A. (1970), *Exit, Voice, Loyalty*. Cambridge, Mass.: Harvard University Press.
- Holmström, B. (1979), "Moral Hazard and Observability". In *Bell Journal of Economics*, 10: 74-91.
- Jeammaud, A., Lyon-Caen, A. (1982), 'Droit et direction du personnel'. In *Droit Social*, No. 1, Jan.: 56-69.
- March, J., Schulz, M., Zhou, X. (2000), *The Dynamics of Rules. Change in Written Organizational Codes*. Stanford: Stanford University Press.
- Reynaud, B. (2002), *Operating Rules in Organizations. Macroeconomic and Microeconomic Analyses*. Houndmills, Basingstoke and New York: Palgrave Macmillan.

Vanberg, V. (1994), *Rule and Choice in Economics*. London and New York: Routledge.

Wittgenstein, L. (1953), *Philosophical Investigations*. Oxford: Basil Blackwell.

Wittgenstein, L. (1958), *Remarks on the Foundations of Mathematics*. G. E. M. Anscombe, R. Rhes & G. H. Von Wright (Eds.), Oxford: Basic Blackwell Publishers.

Wittgenstein, L. (1997), *Dictées de Wittgenstein à Friedrich Waismann et pour Moritz Schlick. Textes inédits*. Tome 1. A. Soulez, (dir.) Paris: Presses Universitaires de France.

Abbreviations used for Wittgenstein's books

PU Wittgenstein, L. (1953), *Philosophische Untersuchungen*. [*Philosophical Investigations*. Oxford: Basil Blackwell.]

Annex 1. The minimum and maximum DEC ratios

1. Quantitative ratios

Output = team's total output over 6 months (no. of WOUs)/no. of operatives.

Minimum DEC ratio = Physical output in 1991 x AME approved work time (minimum DEC time: 5 hours 80)/average team time. (The average time is derived from the snapshot observations.)

Maximum DEC ratio = Physical output in 1991 x max DEC work time (6h 50)/average team time.

An overall mark, from 0 to 10, is determined on the basis of the two thresholds, with 0 being awarded for the minimum DEC threshold and 10 for the maximum DEC threshold.

Example of a team:

'The change over to a reference working time of 6 hours 30 minutes at a work rate of 100 makes it possible to release 1 operative. The output produced in 1991, 16316 output units, will have to be produced in 1992 with 18 operatives instead of 18.6.' (...)

- 'The reduced average time for team EK1 with 18 operatives at a work rate of 100 is 6 hours 20 minutes (6.34).
- Average time for 18 operatives = $6.13 \times 18.6 / 18 = 6.34$

The DEC target for the corrective element is calculated as follows:

- 1991 corrective output ratio = $0.5 \times (16316/15) = 544$ (the figure 15 equals the number of agents who produced 16316 weighted output units in 1991).
- Minimum corrective DEC ratio = $544 \times (5.80/6.34) = 498$.
- Maximum corrective DEC ratio = $544 \times (6.50/6.34) = 558'$.

2. The qualitative ratios relate to both external and internal quality

External quality = number of recurrent faults/number of components received

The information in the database is used as a norm in order to award a mark between 0 and 5 (0 equates to the worst ratio recorded in the database).

Internal quality = team's ability to deal with peak periods and not generate debts; the principle is the same as for external quality (variation from 0 to 5).

Overall quality is the sum of the external and internal quality marks (0 to 10).

3. Calculating the bonus

In general, the overall bonus is the product of two marks.

In the following example, the quantity indicator = 9 and the quality indicator = 9.

DEC = $9 \times 9 = 81$; thus the bonus is 81% of the maximum (500 FF).

Source: Extracts from a team's contract.

List of Acronyms

AME: Atelier de Maintenance des Equipements Electroniques

BPU: *Basic Production Units*

DEC: *Convention d'Expérimentation de la Démarche d'Efficacité Collective*

MRF : Matériel Roulant Ferroviaire

NTR: Nothing to Report

RATP: Régie Autonome des Transports Parisiens.

WOU: Weighted Output Units