



Incentive contracts and time use

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Abstract

Empirical studies on incentive contracts have primarily been concerned with the effects on employees' productivity and earnings. The productivity increases associated with such contracts may, however, come at the expense of quality of life at or outside work. In this paper we study the effect on the employees' non-work activities, testing whether incentive contracts lead to a change in the allocation of time across work and non-work activities. In doing so, we distinguish between two effects, a substitution effect and a discretion effect. On the one hand, the introduction of explicit incentives raises the marginal payoff to work, hence employees are expected to work more and spend less time on non-work activities (substitution effect). On the other hand, employees with an incentive contract tend to have more discretion to choose their work hours. Therefore, they may choose to do the same job in less time and have more spare time for non-work activities (discretion effect). Using data from the European Working Conditions Survey, we show that performance pay has a negative effect on non-work activities and a positive effect on work hours. The substitution effect is negative for men's leisure activities and for women's charitable and political activities.

JEL-Codes: J22, J33, M52

Keywords: Incentive contracts, performance pay, time use, work and non-work activities, work-family balance

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1 Introduction

Research on the impact of incentive contracts has mainly been concerned with its effects on earnings of employees and performance of firms (Booth and Frank 1999; Lazear 2000; Parent 1999; Freeman and Kleiner 2005; Shearer 2004). Considerably less is known about other consequences, such as worker turnover, job satisfaction (Money and Graham 1999; Heywood and Wei 2006) and competition among employees (Drago and Garvey 1998). Increased use of incentive pay schemes is frequently accompanied by changes in the design of jobs and work organizations. In particular, paying for performance typically means increasing the discretion of employees with respect to choice of work hours and methods (Ortega 2009)¹. There is a small economic literature (and a large number of works in psychology and sociology) on how increased demands of work life affect job satisfaction (see Greene 2006 for a discussion and analysis) or the work-family life balance (Berg, Kalleberg and Appelbaum 2003) and related time stress (Hamermesh and Lee 2007). Investigations of how changes in compensation schemes spill over to other parts of individuals' lives have, however, been thin on the ground.

Our intention in this paper is to contribute to fill one of these gaps. We focus on how incentive contracts affect employees' private lives in terms of time available for housework (cooking, cleaning), taking care of children, elderly or disabled relatives, and sports, cultural and other leisure activities. In other words, in our study we examine the extent to which performance-related pay schemes contribute to the much discussed worsening of the "work/life balance" as it is called Europe ("time squeeze" is the term used in North America; see OECD 2004). The term "time squeeze" is associated with the stress caused by an imbalance between work and family requirements, and this paper we do not have any measures of stress. However, we are able to measure time spent in and out of work and therefore can estimate whether incentive contracts are associated with less time available for non-work activities. Our empirical analysis is based on the European Working Conditions Survey from year 2000, which provides us with a fairly rich data set on working conditions and individuals' activities outside work in 27 European countries.

Household work and family care are the non-market activities that have been studied most in the time use literature. A considerable portion of this research has been concerned with the consequences of time spent on household work and taking care of family on (especially women's) wages. Consequently a large literature has documented a negative relationship between household work and women's wages (see e.g., Hersch and Stratton 1997, and Stratton 2001) and a corresponding positive relation for men. As shown by Bonke et al. (2005), the negative effect for women is mainly due to inflexibility of household work and this is further strengthened by inflexible work time schedules. Thus the question we address in this paper is

¹ Moreover, Lemieux, MacLeod and Parent (2009) have shown that the increased use of performance pay accounts for a sizable fraction of the increase in U.S. wage inequality in the seventies and eighties.

different since we are interested in how monetary incentives influence household work and family care. On the other hand, most research on leisure has focused on how the greater access to leisure affects leisure consumption (Gershuny 2005). An important feature of leisure is that its consumption is complementary among spouses (and other family members); see Hills and Juster 1985, and Jenkins and Osberg 2005. Hence, a reduction in time available for leisure may have a negative externality on the employee's family members. Although the data that we use do not allow us to measure time allocation within the household, we find different effects of performance pay for employees who live alone and other employees. Finally, note that in our study we do not, unlike most previous studies, see e.g., Anttila, Oinas and Nätti (2009), make use of data on individuals' perceptions of time stress. As pointed out by Hamermesh and Lee (2007), due to binding time constraint and increased abundance of goods, more and more people will be harried. Thus, perceptions of time stress will largely reflect differences in income levels.

Some limitations of our study with respect to the existing time use literature are the absence of data on hours of sleep and dual earner households and the fact that the variables on non-work activities are not continuous. However, the data have some advantages over time use surveys, particularly the information about the use of monetary incentives, which makes it possible to link the time use literature with the performance pay literature.

Our empirical study is guided by a model of the Holmström and Milgrom's (1991) multi-task variety. The aim of the model is to show that the effect of performance pay on non-work activities can be decomposed into a "substitution effect" (employees spend less time on private activities because better work performance leads to a higher bonus) and a "discretion effect" – with a performance pay contract employees are given more discretion over work hours and can choose to spend more or less time on private activities. Moreover, the model shows that substitution effects are different for activities where the individual cannot be replaced (e.g. sports activities) and those where he can be easily substituted for (e.g. housework). Specifically, the substitution effect is such that employees will always spend less time on the latter but might spend more or less time on the former.

In the empirical sections we use two difference approaches. First we estimate the total effect of performance pay on non-work activities for men and women. We find a positive effect of performance pay on men's hours worked, and the effect on non-work activities, when significant, is generally positive. Second, we use a differences approach which enables us to estimate the substitution effect. This alternative approach takes advantage of an interesting feature of the data – the information about employees' discretion over work schedules. Using this approach, we find that women with a performance pay contract reduce the amount of time spent on charitable and political activities, whereas men reduce the amount of time spent on leisure. Estimates of the substitution effect also indicate that men with a performance pay contract work more hours, whereas women only work more significantly more hours when they live alone.

The rest of the paper is structured as follows. In Section 2 the theoretical framework and the hypotheses to be tested are presented and derived. Section 3 contains the data description. In the following two sections we report results from analyses using two different estimation approaches. Section 6 concludes.

2 Theory

To guide the empirical analysis we propose the following version of Holmström and Milgrom's (1991) multi-task agency model. Suppose a risk-neutral firm employs a risk-averse individual whose work effort is not observable. The employee makes three choices outside work: in particular, she chooses the amount of housework and family-related work, the amount of leisure, and the amount of housework services purchased in the market. Such services are assumed to be a perfect substitute for the employee's own housework². The model also takes into account that time imposes a limit on the amount of work and non-work activities that the employee can carry out.

As in Lazear (1986), we consider two different contractual arrangements. In the first one, the employee is paid according to an explicit incentive contract and has discretion to choose the amount of work effort she wants to exert, and under the second arrangement she is paid a straight salary. Because in the latter case she would not have any incentive to work, the firm must supervise her in order to ensure that she works for a minimum amount of time or supplies a minimum level of work effort. Two other contractual arrangements are of course possible but will not be optimal in this simple model: if there is a performance pay contract but the employee does not have discretion, she will be inefficiently exposed to risk. Given that she is being monitored, the contract can be improved by paying her a fixed salary. The other suboptimal contract is the one where the employee is paid a fixed salary and has discretion to choose effort, for in that case she will choose a level of effort equal to zero.

We consider a multi-task agency model with one principal (the firm) and one agent (the employee). Besides work effort (e), the employee chooses the amount of housework (h) and leisure (L). Total time available is normalized to one ($e + h + L = 1$). The employee can also hire an amount x of housework services at a unit price of p . Her utility function has a constant absolute risk aversion coefficient³ equal to r and is given by

$$(1) \quad U = -\exp\left\{-r\left[c + B(h + x) + F(L) - g(e, h)\right]\right\},$$

² Thus, the term "housework" refers to house-related activities for which there exists a market substitute (e.g. cooking and cleaning) whereas for "leisure" such market substitutes do not exist (we do not pay someone to watch a movie for us). There are of course activities for which only an imperfect market substitute exists (e.g. taking care of children).

³ Holmström and Milgrom (1987) show that if the agent's coefficient of absolute risk aversion is constant, then the optimal contract will be linear. We therefore assume this utility function to make sure that the linear contracting assumption is consistent with optimality.

where c is consumption, $B(\cdot)$ are the private benefits derived from housework, $F(\cdot)$ is the net utility of leisure, and $g(\cdot, \cdot)$ is the cost of effort. Housework services are assumed to be a perfect substitute for the employee's own housework effort: $B = B(h + x)$, with $B' > 0$ and $B'' < 0$. Moreover, leisure is assumed to increase utility $F' > 0$ at a decreasing rate $F'' < 0$. As far as the cost function is concerned, all first and second partial derivatives are assumed to be positive, which in particular implies that e and h are substitutes in the utility function (complements in the cost function). In addition, the cost function is assumed to be quadratic: $g(e, h) = e^2/2 + \gamma h^2/2 + \kappa eh$, where $\gamma, \kappa > 0$. The employee's budget constraint is given by $c + px = w$, where for simplicity the price of consumption is normalized to one. The firm is risk neutral, with profits given by $y - w$, where y denotes value added and w employee compensation. Specifically, we assume that $y = e + \varepsilon$, where $\varepsilon \sim N(0, \sigma^2)$.

There are two contractual arrangements. Under a performance pay system, the employee is paid $w = \beta + \alpha y$ (where β and α are positive parameters) and has discretion to choose effort (e). Under a salary system, she receives $w = \beta$, and firm supervision ensures that she supplies a minimum level of work effort, \underline{e} .⁴ We use e^{pp} , h^{pp} , L^{pp} and x^{pp} to denote the optimal choices under the performance pay system, and e^s , h^s , L^s and x^s to denote the optimal choices under the salary system.

Let $A = (h, L)$, and suppose $A^s(0)$ denotes the level of non-work activities when the employee is paid a fixed salary and is not supervised (i.e. when $\underline{e} = 0$). Then the total effect of moving from a salary system to a performance pay system can be decomposed as:

$$(2) \quad A^{pp} - A^s(\underline{e}) = [A^{pp} - A^s(0)] + [A^s(0) - A^s(\underline{e})],$$

where the "substitution effect" (the effect of introducing performance pay when employees already have discretion) is given by $[A^{pp} - A^s(0)]$, and the "discretion effect" (the effect of giving discretion when employees are paid on a salary basis) is given by $[A^s(0) - A^s(\underline{e})]$.

Proposition: Suppose the firm moves from a salary system to a performance pay system. If work effort increases $e^{pp} > \underline{e}$, then:

1. The total effect on housework is negative $h^{pp} < h^s$, the substitution effect is negative, and the discretion effect is positive.
2. The total effect on leisure is negative $L^{pp} < L^s$, the substitution effect is negative, and the discretion effect is positive if and only if $\kappa < \gamma$.

Proof: See Appendix.

The economic intuition for these results can be summarized as follows. Due to the multi-task nature of the problem, in equilibrium the marginal benefit of housework must be equal to the marginal benefit of leisure. When moving from a salary system to an incentive pay system,

⁴ Thus \underline{e} is positively related to the extent of monitoring, and negatively related to the employee's discretion. The more the employee is supervised, the higher e and the lower her discretion. In particular, if there is no supervision, $\underline{e} = 0$, which means that the employee is free to choose her preferred effort level.

the employee increases work effort, which raises the marginal benefit of leisure. Hence, to go back to equilibrium, the marginal benefit of housework must increase and/or the marginal benefit of leisure must diminish. A reduction in housework will always achieve both goals: it will reduce the marginal benefit of leisure, and it will of course increase the marginal benefit of housework. As far as leisure is concerned, the effect of performance pay will depend on the increase in work effort relative to the reduction of housework, because leisure is any amount of time that is not spent on work or housework. This will in turn be determined by the degree of substitutability between work and housework: if work and housework are only weak substitutes, a small reduction of housework will suffice to increase the marginal benefit of housework back to an equilibrium level. In that case, since the reduction of housework is relatively small compared to the increase in work effort, leisure will diminish. In contrast, if work and housework are strong substitutes, a large reduction of housework will be needed to increase the marginal benefit of housework back to an equilibrium level. In that case leisure will actually increase, because the reduction in housework is relatively large compared to the increase in work effort.

Furthermore, since the two contractual arrangements differ both in how employees are paid and in how much discretion they have, the effect of moving from a salary system to a performance pay system can be expressed as the sum of two effects, a “discretion effect” and a “substitution effect.” The discretion effect is the effect of introducing discretion when employees are being paid a straight salary, and the substitution effect is the effect of introducing performance pay when employees already have discretion. The model shows that the substitution effect is always negative for housework, whereas for leisure it is only negative when there is little substitutability between work and housework. The logic is similar to the one outlined above: if employees already have discretion, the introduction of incentive pay will increase work effort and, if housework stays constant, leisure will diminish and the marginal benefit of leisure will increase above the marginal benefit of housework. A reduction in housework will increase the marginal benefit of housework and (since there will be more time for leisure) will reduce the marginal benefit of leisure. The substitution effect on leisure will be positive or negative depending on the size of the reduction in housework relative to the increase in work effort (which hinges on the degree of substitutability between the two).

3 Data description

The third European Working Conditions Survey (EWCS) was carried out in 2000 for fifteen European Union member states and in 2001 for twelve “candidate states”.⁵ The data are a cross-section of more than 24,000 employees representing all industries and occupational

⁵ In 2000, the European Union member states were Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxemburg, Netherlands, Portugal, Spain, Sweden, and United Kingdom. The candidate countries were Bulgaria, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia, and Slovenia.

groups, and provide information on incentive contracts, discretion, work hours and time spent on non-work activities.⁶

An individual is defined to receive performance pay if she receives any of the following payments: piece rate or productivity payments, payments based on the overall performance of the company she works in (profit sharing), payments based on group performance, and income from shares of the company she is working for. As can be seen from Table 1, piece rates and profit sharing are clearly the most prevalent incentive schemes, and 16.4 per cent of the employees receive at least one form of performance-related pay.

Table 1
Descriptive statistics for performance pay

	Mean	Std. dev.	n
1. Piece rate or productivity payment	.105	.306	27,083
2. Group performance pay	.024	.154	27,083
3. Profit sharing	.056	.230	27,083
4. Stock ownership	.009	.094	27,083
5. Performance pay	.164	.402	27,083

Note. All variables are dichotomous. Performance pay is a dichotomous variable equal to one if the respondent receives at least one type of performance pay.
Source: European Working Conditions Survey 2000/01, own calculations.

As for non-work activities the questionnaire asks the respondents on a scale from 0 (never) to 5 (every day for at least one hour) about the frequency of their involvement in several types of activities: voluntary or charitable activities, political/trade union activities, caring for and educating their children, cooking, housework, caring for elderly/disabled relatives, taking a training or education course, sporting activities, cultural activities and other leisure activities. In our empirical analysis, reported below, we will not consider educational activities because for some respondents these may involve training for their jobs. As can be seen from Table 2, participation in political/trade union activities is rare as is involvement in charitable activities and taking care of disabled or elderly relatives. Not surprisingly, the most prevalent non-work activities are housework, child care, cooking and “other leisure”, followed by sports and cultural activities.

Since theory suggests distinguishing between private activities for which the market provides a close substitute and those for which no market substitute really exists, we use the information available to construct four different indexes (see Table 3).⁷

⁶ The third EWCS is more informative than the other EWCS available cross sections (first, second and fourth EWCS): the first and second Surveys (1990 and 1995, respectively) do not include information on non-work activities, and the questions included in the fourth EWCS (2005) are less precise than the ones included in the third EWCS. More precisely, in the fourth EWCS activities are grouped so that information is more aggregated than in the third EWCS.

⁷ Although we use these indexes for our main results and discussion, we also report results by individual activities (see Section 4 below).

Table 2
Descriptive statistics for non-work activities, by sex

	Men				Women			
	Mean	Std. dv.	Median	n	Mean	Std. dv.	Median	n
1. Cooking	2.384	1.852	3	13,573	4.279	1.259	5	13,119
2. Housework	2.587	1.779	3	13,598	4.369	1.074	5	13,172
3. Children care	2.321	2.248	3	11,618	2.899	2.340	5	11,427
4. Disabled/elderly	.513	1.209	0	12,213	.815	1.509	0	11,724
5. Charity	.533	1.035	0	13,363	.537	.988	0	12,766
6. Political	.227	.711	0	13,306	.146	.550	0	12,723
7. Sport	1.607	1.619	2	13,445	1.350	1.589	0	12,795
8. Cultural	1.063	1.256	1	13,456	1.134	1.218	1	12,861
9. Leisure	2.590	1.565	3	13,543	2.394	1.577	3	12,932

Note. For each out-of work activity there are six possible responses: “never” (0); “once or twice per year” (1); “once or twice per month” (2); “once or twice a week” (3); “every day or every second day for less than one hour” (4); “every day for at least one hour” (5).

Source: European Working Conditions Survey 2000/01, own calculations.

Table 3
Descriptive statistics for the indexes of work and non-work activities, by sex

	Description	Men			Women		
		Mean	Std. dev.	n	Mean	Std. dev.	n
Housework	Annual number of hours spent on cooking and housework	382.079	493.540	13,507	1057.643	516.978	13,091
Familycare	Annual number of hours spent on taking care of children and disabled or elderly relatives	283.348	352.864	10,751	432.648	398.368	10,549
Charipol	Annual number of hours spent on charitable and political activities	23.413	109.757	13,189	16.948	85.903	12,606
Leisure	Annual number of hours spent on sports, cultural, and other leisure activities	267.505	371.349	13,194	228.242	339.507	12,562
Work	Annual number of hours worked	2,143.329	534.556	13,666	1,867.887	617.851	13,131

Source: European Working Conditions Survey 2000/01, own calculations.

The first one, HOUSEWORK, is defined as the sum of the variables referring to cooking and housework. Both are activities for which the market can provide very close substitutes. The second index is called FAMILYCARE and measures time spent taking care of children or elderly / disabled relatives. These are activities for which the market provides imperfect substitutes. The third and fourth indexes capture non-work activities for which the market cannot provide a substitute: CHARIPOL (charitable and political activities) and LEISURE (sports, cultural and other leisure activities). The reason for using two different indices for these activities is that in the former case it could be argued that some market substitution would be possible (i.e., donating money to charitable organizations or political associations), whereas in the latter case it would be much more difficult. Since the response options for non-work activities do not increase linearly, we use a non-linear scale reflecting how many times per year the employee participates in each kind of activity to compute the annual number of hours spent on each activity.⁸ Table 3 shows summary statistics for the four indexes: HOUSEWORK, FAMILYCARE, CHARIPOL and LEISURE. Women devote more time to housework and taking care of their children and elderly or disabled relatives than men. On average, men dedicate one hour per day to housework, whereas women dedicate an average of nearly three hours per day. Time devoted to take care of children and other relatives is 0.8 and 1.2 hours per day for men and women respectively. On the other hand, men dedicate more time to leisure and charitable and political activities.

To measure work hours, we construct a variable from answers in the questionnaire concerning the number of weekly hours usually worked in main job. In addition, for those who have another regular job beside their main job, we add the usual weekly hours in this secondary job. The average number of hours per week is 41.1 for men and 35.8 for women. In the regressions we use the annual number of hours so that the measurement of work hours is consistent with that of non-work activities.

To make sure that our results were not conditioned by our measurement approach, we have also used other criteria to transform the survey responses to numbers of hours. First, note that for non-work activities, the two highest response options are defined in terms of the frequency and the amount of time devoted, whereas the remaining options are only defined in terms of the frequency. This means that the values for the two highest options could be defined slightly differently, or those two response categories could be merged (in that way, the resulting measure would only convey information on frequency, i.e. no information on duration). Second, we could use time shares (instead of frequency or number of hours) for work and non-work activities. This would take into account that all individuals must face the same time constraint and would correct for the fact that survey respondents tend to over-report time spent (Juster and Stafford 1991). However, it could be criticized on the grounds that all non-work activities are not mutually exclusive. For example, cooking and taking care of a ten-year-old

⁸ Specifically, the response “never” is quantified as zero; “once or twice per year” is quantified as 1.5; “once or twice per month” as 18 (i.e., 1.5×12); “once or twice a week” as 72 (i.e., $1.5 \times 12 \times 4$); “every day or every second day for less than one hour” as 273.75 (i.e., 0.75×365); and “every day for at least one hour” as 730 (i.e., 2×365)

child can be done simultaneously, and so can reading and taking care of an elderly relative. In Section 4 we report the results obtained with different measurement approaches.

The EWCS includes a number of questions concerning discretion. The information we use emanates from a question on whether the employee can or cannot influence her working hours. In addition, we use a number of control variables summarized in Table 4 below, as well as establishment size, industry, country, net earnings and occupation dummies.⁹ Not surprisingly, men are more often employed on permanent contracts and the main income earner in the household. Furthermore, men have somewhat more discretion regarding work hours than women.

Table 4
Descriptive statistics of discretion and main control variables

	Men			Women		
	Mean	Std. dev.	n	Mean	Std. dev.	n
Discretion over work hours	.348	.476	13,661	.327	.469	13,088
Household size	2.111	1.343	13,819	2.078	1.297	13,254
Small children	.710	.958	13,821	.720	.920	13,256
Main income earner	.780	.414	13,723	.416	.493	13,132
Married	.593	.491	13,781	.562	.496	13,193
Part-time contract	.066	.248	13,821	.249	.432	13,256
Permanent contract	.823	.381	13,665	.797	.402	13,085
Age	38.447	11.249	13,821	38.061	10.930	13,256

Note. All variables are dichotomous except the two hours worked variables (measured in number of hours), household size (number of individuals living in the household), age (measured in years), and small children (measured in a 0 to 4 scale: 0 = none, 1=one, 2=two, 3= three, 4=four or more).

Source: European Working Conditions Survey 2000/01, own calculations.

The data show that discretion over work hours is positively correlated with incentive pay, but the correlation is small (3.4 percent). Of the total sample 56 percent had neither discretion nor incentive pay. Another relatively large category is those with discretion but no performance contract; their share is 27.6 per cent. Finally, 10.3 per cent are on performance pay contracts but lack discretion with respect to work hours, and the remaining 6.1 per cent have discretion as well as performance pay. Note that, on the one hand, the group of employees with no dis-

⁹ Establishment size is measured according to the number of employees and is defined in eight intervals (1, 2-4, 5-9, 10-49, 50-99, 100-249, 250-499, and 500 and over). Industries and occupations are defined at one-digit level according to the European General Nomenclature of Industrial Activities (NACE Rev. 1) and the International Standard Classification of Occupations (ISCO-88) respectively. As far as net earnings are concerned, the EWCS provides information about the income interval to which the individual belongs. Twelve different intervals are defined according to the income distribution of each country (each interval corresponds to a different quantile).

cretion and no incentive pay is larger than the group of employees with discretion and no incentive pay, and is also larger than the group with performance pay and without discretion. On the other hand, employees with discretion and performance pay are outnumbered by employees with discretion and no incentive pay and by those without discretion and with incentive pay. Although one may like to interpret these descriptive statistics as evidence favorable or unfavorable to the theory, some caution is needed. The multi-task theoretical framework focuses on how measurement problems and incentives influence the optimal contracting choices, assuming that the only cost of discretion is the principal's loss of control. However, in practice, firm's ability to give discretion is limited by the characteristics of the production process, i.e. by "technology." For example, if a given number of employees must work simultaneously in a production site with the same set of industrial robots, the firm cannot give full discretion over work hours. This type of coordination problems and fixed proportions technology are not captured by the model. A more accurate reading of the model is that, controlling for "technological" differences, one should observe a positive correlation between incentive contracts and discretion. Evidence from other research based on this and other data is consistent with this.¹⁰

In the following sections we use two different empirical strategies to estimate the effect of incentive contracts on non-work activities.

4 Estimates of the determinants of non-work activities

To begin with, we report estimates from linear regressions in which the left-hand-side variable is time spent on different activities. We estimate the models for men and women separately, using systems of seemingly unrelated regression equations. The key right-hand-side variable is the dichotomous variable for performance-related pay. Given the nature of the data, we cannot rule out the possibility that performance pay is endogenous, but to attenuate this potential problem we include a very comprehensive set of controls: the employee's age, age squared, marital status, whether she is the main income earner in the household, size of the household, number of children below age 15 who live with her, a dummy for whether she is employed on a permanent/fixed-term, a dummy for part-time work, net earnings, occupation and country of residence, and the size and industrial affiliation of the establishment in which she works.

The estimation results are given in Tables 5a and 5b for men and women, respectively. (To save space, the country, establishment size, industry, net earnings, and occupation dummy estimates are not shown in the tables.)

¹⁰ Studies made with various datasets have shown a significant relationship between discretion and performance pay. Evidence from the EWCS can be found in Ortega (2009), and evidence from other datasets, in Osterman (1994b); MacLeod and Parent (1999); and Nagar (2002).

Table 5a
Seemingly unrelated regressions –
Annual number of hours spent by men on non-work activities

	Housework	Familycare	Charipol	Leisure
Performance pay	-19.538 (13.147)	12.989 (8.815)	1.209 (3.311)	1.117 (10.704)
Household size	-99.066 *** (5.598)	35.304 *** (3.753)	.857 (1.410)	-3.722 (4.558)
Small children	80.812 *** (7.386)	98.062 *** (4.953)	2.416 (1.860)	-14.940 ** (6.014)
Main income earner	-49.122 *** (14.048)	38.210 *** (9.419)	2.429 (3.538)	-41.720 *** (11.438)
Married	-123.600 *** (13.129)	102.126 *** (8.803)	-.356 (3.306)	-30.044 *** (10.690)
Part-time contract	.217 (21.257)	-12.286 (14.253)	16.660 *** (5.353)	25.713 (17.308)
Permanent contract	-18.226 (13.965)	9.666 (9.364)	-5.428 (3.517)	11.757 (11.370)
Age	32.835 *** (3.478)	30.783 *** (2.332)	-.640 (.876)	-14.671 *** (2.832)
Age squared	-.374 *** (.043)	-.401 *** (.029)	.014 (.011)	.139 *** (.035)
n	7,878	7,878	7,878	7,878
R-squared	.239	.338	.031	.107

Note. Standard errors are shown in parentheses. Levels of significance: (***) 1 percent; (**) 5 percent; (*) 10 percent. All regressions include 26 country dummies, 8 occupation dummies, 11 industry dummies, 11 net income dummies, 7 establishment size dummies, and a constant. All other variables are shown in the table.

Source: European Working Conditions Survey 2000/01, own calculations.

We can see that incentive contracts do not have significant coefficients for men, whereas for women they are only associated with more time spent on leisure. Moreover, the magnitude of this estimate is small: about twenty-five minutes per week, equivalent to an 8-percent reduction in leisure for the average employee in the sample. On the other hand, most control variables are highly significant. Some estimates have the same sign for both men and women: household size (controlling for the number of children) has a negative relationship with housework and a positive relationship with family care; the number of small children (controlling for household size) has a positive relation with both housework and family care; being married is positively related with family care and negatively related with leisure; and age is positively related with both housework and family care and negatively related with leisure. Other estimates vary according to sex: thus, the relation between being married and housework is negative for men and positive for women. We also find that for women working part-time is positively associated with housework, family care, and leisure, whereas for men the only positive association is with charitable and political activities. Having a permanent contract also seems to be more relevant for women's than for men's non-work activities: for women, being on a permanent contract has a positive relationship with housework and nega-

tive relationship with charitable and political activities, whereas for men the permanent nature of the contract is insignificant in all cases.

Table 5b
Seemingly unrelated regressions –
Annual number of hours spent by women on non-work activities

	Housework	Familycare	Charipol	Leisure
Performance pay	-11.884 (15.697)	6.905 (11.276)	2.788 (3.230)	21.741 * (11.480)
Household size	-47.092 *** (5.654)	49.764 *** (4.061)	2.958 ** (1.163)	-10.535 ** (4.135)
Small children	121.213 *** (7.234)	143.366 *** (5.197)	-2.795 * (1.488)	-21.453 *** (5.291)
Main income earner	2.508 (12.166)	67.198 *** (8.740)	3.843 (2.503)	-5.716 (8.898)
Married	176.991 *** (12.626)	78.563 *** (9.070)	.644 (2.298)	-21.785 ** (9.234)
Part-time contract	77.355 *** (13.742)	29.399 *** (9.872)	.802 (2.827)	39.503 *** (10.050)
Permanent contract	24.638 * (13.012)	10.490 (9.347)	-5.351 ** (2.677)	-2.969 (9.516)
Age	54.233 *** (3.481)	51.058 *** (2.500)	.963 (.716)	-5.889 ** (2.546)
Age squared	-.573 *** (.044)	-.641 *** (.031)	-.008 (.009)	.051 (.032)
n	7,811	7,811	7,811	7,811
R-squared	.249	.377	.022	.117

Note. Standard errors are shown in parentheses. Levels of significance: (***) 1 percent; (**) 5 percent; (*) 10 percent. All regressions include 26 country dummies, 8 occupation dummies, 11 industry dummies, 11 net income dummies, 7 establishment size dummies, and a constant. All other variables are shown in the table.

Source: European Working Conditions Survey 2000/01, own calculations.

Table 6 shows the results of similar seemingly unrelated regressions estimated for the four types of non-work activities included in Table 5 and the number of hours worked. Results for non-work activities are similar to those reported in Table 5. In particular, for men performance pay is not significant in any of non-work regressions, and for women it is only significant in the regression for leisure.

As far as the relation between performance pay and work hours is concerned, we only find a significant result for men, but the effect is rather small: the estimate implies that employees with incentive pay spend about an hour more at work per week (equivalent to a 2-percent increase for the average male employee in the sample).

For women no significant relation between performance pay and hours worked is found. As far as the control variables are concerned, the signs and significance of the estimates for non-work activities are the same as in Table 5, and the main results for work hours are that for men age has a positive coefficient, and for women being married and having small children have both negative coefficients.

Table 6a
Seemingly unrelated regressions –
Annual number of hours spent by men on non-work and work activities

	Housework	Familycare	Charipol	Leisure	Work
Performance pay	-19.270 (13.246)	13.948 (8.887)	1.248 (3.341)	4.976 (10.792)	26.773* (14.691)
Household size	-98.871*** (5.623)	35.337*** (3.773)	.800 (1.418)	-3.209 (4.581)	7.821 (6.236)
Small children	80.147*** (7.415)	98.228*** (4.975)	2.337 (1.870)	-15.448** (6.042)	-6.284 (8.224)
Main income earner	-52.322*** (14.131)	38.047*** (9.481)	2.291 (3.564)	-39.360*** (11.513)	18.465 (15.673)
Married	-122.917*** (13.178)	102.678*** (8.842)	.163 (3.324)	-31.099*** (10.737)	-18.929 (14.616)
Part-time contract	2.352 (21.448)	-12.388 (14.390)	17.282*** (5.410)	25.527 (17.474)	-471.981*** (23.788)
Permanent contract	-17.167 (14.044)	7.960 (9.423)	-5.706 (3.543)	11.092 (11.442)	17.720 (15.576)
Age	32.934*** (3.496)	30.898*** (2.346)	-.645 (.882)	-14.719*** (2.848)	12.007*** (3.878)
Age squared	-.376*** (.043)	-.402*** (.029)	.014 (.011)	.141*** (.035)	-.172*** (.048)
n	7,813	7,813	7,813	7,813	7,813
R-squared	.239	.338	.031	.106	.177

Note. Standard errors are shown in parentheses. Levels of significance: (***) 1 percent; (**) 5 percent; (*) 10 percent. All regressions include 26 country dummies, 8 occupation dummies, 11 industry dummies, 11 net income dummies, 7 establishment size dummies, and a constant. All other variables are shown in the table.

Source: European Working Conditions Survey 2000/01, own calculations.

We also estimate the regressions in Table 6 with a control for educational level. (To save space, the table is omitted.) Unfortunately, this variable is only available for the twelve “candidate states” and measures educational achievement with some error since the survey reports the age at which the respondent stopped full-time education, but does not provide information about the educational level achieved. In these regressions, controlling for years of education does not make a difference as far as the estimated relationship between performance pay and the allocation of time is concerned. Both with and without the control, the relationship is only significant for men’s housework (we find a positive relationship) and for women’s hours of work (we find a negative relationship).

As a matter of fact, years of education are only significant in two regressions (men’s leisure and women’s family care).¹¹ Note, however, that all these regressions include controls for net earnings, occupation, and age, which are correlated with educational level. Because there are potential problems involved in the measurement of the non-work activities (as explained in Section 3 above), we also estimate the system of equations with different measurement criteria for the left-hand-side variables.

¹¹ In both cases, the coefficient for years of education is positive.

Table 6b
Seemingly unrelated regressions –
Annual number of hours spent by women on non-work and work activities

	Housework	Familycare	Charipol	Leisure	Work
Performance pay	-12.967 (15.794)	7.259 (11.329)	2.845 (3.207)	21.560* (11.507)	25.564 (17.083)
Household size	-47.985*** (5.666)	50.124*** (4.064)	3.123*** (1.151)	-10.348** (4.128)	6.926 (6.128)
Small children	121.040*** (7.256)	143.773*** (5.205)	-2.739* (1.473)	-21.902*** (5.286)	-16.680** (7.848)
Main income earner	-.157 (12.206)	66.493*** (8.756)	3.686 (2.479)	-5.396 (8.893)	38.151*** (13.202)
Married	177.426*** (12.663)	79.171*** (9.083)	1.240 (2.572)	-20.556** (9.226)	-29.118** (13.697)
Part-time contract	78.476*** (13.784)	29.699*** (9.887)	-.515 (2.799)	37.192*** (10.042)	-639.170*** (14.909)
Permanent contract	24.471* (13.061)	9.413 (9.369)	-5.873** (2.652)	-5.581 (9.516)	-20.194 (14.127)
Age	54.372*** (3.495)	50.827*** (2.507)	.815 (.710)	-5.728** (2.547)	5.506 (3.781)
Age squared	-.576*** (.039)	-.638*** (.032)	-.006 (.009)	.049 (.032)	-.090* (.048)
n	7,751	7,751	7,751	7,751	7,751
R-squared	.249	.379	.022	.118	.416

Note. Standard errors are shown in parentheses. Levels of significance: (***) 1 percent; (**) 5 percent; (*) 10 percent. All regressions include 26 country dummies, 8 occupation dummies, 11 industry dummies, 11 net income dummies, 7 establishment size dummies, and a constant. All other variables are shown in the table.

Source: European Working Conditions Survey 2000/01, own calculations.

First, we use time shares as dependent variables, i.e. we divide the (annual) number of hours spent on each non-work activity by the sum of the (annual) number of hours spent on all work and non-work activities.¹² The signs and significance of the coefficients are essentially the same as in Table 5. Second, we use ordered probits for individual activities. The main advantage of this approach is that it tackles the limited dependent variable and censoring problems. In particular, it does not require assigning numerical values to the top two response options (see discussion above). Its main problem is that some information is lost. Since respondents report the frequencies with which they perform various activities, their responses are not purely ordinal, as assumed in an ordered probit. Table 7 shows ordered probit results by activities. For men, incentive pay has a positive effect on childcare, political activities, and cultural activities whereas in Table 5 none of the performance pay estimates was significant. For women, performance pay has a negative effect on housework and a positive effect on time spent taking care of disabled and elderly relatives. This is different from the results reported in Table 5, where we only find a positive relationship between performance pay and leisure.

¹² See Section 3 for details about how hours spent on non-work and work activities have been computed.

Table 7a
Ordered probits by individual activities, men

	Cooking	Housework	Childcare	Disabled & Eld. care	Charity	Political	Sport	Culture	Leisure
Performance pay	-.036 (.029)	.036 (.029)	.072 ** (.036)	.033 (.040)	.020 (.034)	.174 *** (.043)	-.026 (.030)	.096 *** (.030)	.044 (.028)
Household size	-.291 *** (.012)	-.234 *** (.012)	.370 *** (.011)	.129 *** (.017)	.023 (.014)	.028 (.018)	.012 (.013)	-.054 *** (.013)	-.003 (.012)
Small children	.211 *** (.017)	.210 *** (.017)	.499 *** (.020)	-.129 *** (.022)	.012 (.019)	-.006 (.024)	-.058 *** (.017)	-.033 * (.018)	-.066 *** (.016)
Main income earner	-.065 ** (.031)	.055 * (.031)	.138 *** (.015)	.096 ** (.043)	.001 (.036)	.034 (.048)	-.083 *** (.032)	-.101 *** (.032)	-.101 *** (.030)
Married	-.259 *** (.029)	-.207 *** (.029)	.183 *** (.039)	-.083 ** (.040)	.051 (.035)	-.019 (.044)	-.030 (.030)	-.076 ** (.030)	-.090 *** (.028)
Part-time contract	.108 ** (.047)	-.006 (.047)	-.006 (.061)	.107 * (.063)	.134 ** (.054)	-.075 (.076)	.134 *** (.048)	.215 *** (.048)	-.040 (.045)
Permanent contract	-.011 (.031)	-.013 (.031)	.003 (.040)	.040 (.044)	.013 (.037)	.053 (.049)	.060 * (.032)	.048 (.032)	.095 *** (.030)
Age	.103 *** (.008)	.083 *** (.008)	.187 *** (.011)	.078 *** (.011)	.016 ** (.009)	.039 (.012)	-.049 *** (.008)	-.018 ** (.008)	-.023 *** (.007)
Age squared	-.001 *** (.0001)	-.001 *** (.0001)	-.002 *** (.0001)	-.001 *** (.0001)	-.0001 (.0001)	-.0003 ** (.0001)	.0003 *** (.0001)	.0001 (.0001)	.0002 * (.0001)
n	10,270	10,274	8,784	9,267	10,141	10,102	10,143	10,161	10,211
Pseudo R-squared	.097	.110	.214	.055	.045	.055	.071	.058	.050

Note. Standard errors are shown in parentheses. Levels of significance: (***) 1 percent; (**) 5 percent; (*) 10 percent. All regressions include 26 country dummies, 8 occupation dummies, 11 industry dummies, 11 net income dummies, 7 establishment size dummies, and a constant. All other variables are shown in the table.

Source: European Working Conditions Survey 2000/01, own calculations.

Table 7b
Ordered probits by individual activities, women

	Cooking	Housework	Childcare	Disabled & Eld. care	Charity	Political	Sport	Culture	Leisure
Performance pay	-.026 (.039)	-.097** (.039)	-.017 (.046)	.074* (.043)	.073* (.041)	.051 (.059)	.051 (.037)	.036 (.036)	.020 (.034)
Household size	-.164*** (.014)	-.087*** (.014)	.148*** (.016)	.066*** (.011)	.037** (.014)	.033 (.021)	-.033** (.014)	-.057*** (.013)	-.041*** (.012)
Small children	.314*** (.019)	.317*** (.020)	.840*** (.023)	-.122*** (.020)	-.026 (.019)	-.109*** (.028)	-.067*** (.018)	-.034** (.017)	-.092*** (.016)
Main income earner	-.035 (.031)	.055* (.031)	.184*** (.036)	.120*** (.015)	.031 (.032)	.041 (.045)	-.086*** (.030)	-.091*** (.028)	-.128*** (.027)
Married	.472*** (.032)	.425*** (.032)	.413*** (.037)	-.030 (.035)	.027 (.033)	-.036 (.047)	-.102*** (.030)	-.108*** (.029)	-.105*** (.027)
Part-time contract	.142*** (.035)	.243*** (.036)	.164*** (.042)	.091** (.039)	.131*** (.035)	.037 (.052)	.121*** (.033)	.093*** (.032)	.098*** (.030)
Permanent contract	.046 (.033)	.092*** (.033)	.036 (.039)	-.011 (.037)	-.031 (.034)	.007 (.051)	-.018 (.032)	.002 (.030)	.057** (.028)
Age	.127*** (.008)	.114*** (.008)	.225*** (.010)	.058 (.010)	.031*** (.009)	.038*** (.013)	-.024*** (.008)	-.012 (.008)	-.016** (.007)
Age squared	-.001*** (.0001)	-.001*** (.0001)	-.003*** (.0001)	-.0005*** (.0001)	-.0003*** (.0001)	-.0004** (.0002)	.0001 (.0001)	-.00001 (.0001)	.0001 (.0001)
n	10,042	10,080	8,760	9,026	9,809	9,776	9,801	9,855	9,897
Pseudo R-squared	.144	.113	.257	.042	.042	.070	.102	.070	.059

Note. Standard errors are shown in parentheses. Levels of significance: (***) 1 percent; (**) 5 percent; (*) 10 percent. All regressions include 26 country dummies, 8 occupation dummies, 11 industry dummies, 11 net income dummies, 7 establishment size dummies, and a constant. All other variables are shown in the table.

Source: European Working Conditions Survey 2000/01, own calculations.

Third, we estimate the seemingly unrelated equations using the number of times that each activity is performed as dependent variables (results are not shown but are available upon request).¹³ For men, we find that performance pay has a negative relation with cooking and a positive relation with childcare and political and cultural activities. For women, none of the estimates of performance pay are significant.

All in all, the results from different specifications suggest that in most cases time spent on non-work activities is not significantly related with performance pay, but whenever the relationship is significant, it is usually positive. Thus, for men we have found a positive relation of incentive contracts with time spent in child care, political activities and cultural activities; and for women we have found evidence of a positive relation of incentive contracts with leisure and time spent taking care of disabled and elderly relatives. The only negative relations we find are for men's cooking and women's housework. In addition, we find a positive relation between incentive contracts and work hours for men and no significant relation for women.

5 Estimates from a differences approach

We now turn to a different estimation approach, which takes advantage of information on whether employees have discretion to choose their work hours. The EWCS includes several questions on job discretion and one in particular about whether employees "can influence their working hours" (possible answers are yes/no). As shown in Table 4, about 35 percent of employees report having some influence over their work hours. Thus we observe the amount of work and non-work activities performed by four different types of employees: those with a performance pay contract and discretion over work hours, those with a performance pay contract and no discretion over work hours, and those with a salary contract with or without discretion over work hours.

Our estimation approach is based on the hypothesis that the effect of incentive contracts on time use should be larger when employees can influence their working hours. Equivalently, we hypothesize that the effect on time use of being able to influence working hours should be greater for employees who have an incentive contract. Some evidence consistent with this hypothesis is shown in Table 8. In Columns 1 and 2 we estimate OLS regressions with hours worked as left-hand-side variable and performance pay and controls in the right-hand side.¹⁴ In the first column the regression is estimated for the subsample of employees who do not have discretion, and in the second column we estimate it for those who have discretion.

¹³ Given that the two highest response options are defined in terms of the frequency and time spent, whereas the remaining options only refer to the frequency, we collapse the two highest response options into one. Thus, the possible values of each dependent variable are 0 ("Never"), 1.5 ("Once or twice a year"), 18 ("Once or twice per month", i.e. 1.5*12), 72 ("Once or twice a week", i.e. 18*4), and 365 ("Everyday").

¹⁴ The other explanatory variables in Table 8 are the same as in Tables 5-7 and to save space their coefficients are not reported.

Table 8
Estimates of the effect of performance pay (columns 1 and 2)
and the effect of discretion over work hours (columns 3 and 4) on the annual
number of work hours (ordinary least squares estimates)

	(1)	(2)	(3)	(4)
	Employees without discretion coefficient of performance pay	Employees with discretion coefficient of performance pay	Employees without performance pay coefficient of discretion	Employees with performance pay coefficient of discretion
Men	-5.793 (16.349)	59.059*** (21.629)	59.107*** (12.270)	9.058*** (25.022)
Women	36.075* (18.587)	23.787 (26.100)	-15.138 (11.430)	801 (32.534)

Note. Standard errors are shown in parentheses. Levels of significance: (***) 1 percent; (**) 5 percent; (*) 10 percent. Columns 1 and 2: Coefficient of performance pay from an OLS regression in which the left-hand-side variable is the annual number of work hours and the right-hand-side variables are: performance pay, household size, small children, main income earner, married, part-time contract, permanent contract, age, age squared, 26 country dummies, 8 occupation dummies, 11 industry dummies, 11 net income dummies, 7 establishment size dummies, and a constant. Columns 3 and 4: Coefficient of discretion over work hours from an OLS regression in which the left-hand-side variable is the annual number of work hours and the right-hand-side variables are: discretion over work hours, household size, small children, main income earner, married, part-time contract, permanent contract, age, age squared, 26 country dummies, 8 occupation dummies, 11 industry dummies, 11 net income dummies, 7 establishment size dummies, and a constant.

Source: European Working Conditions Survey 2000/01, own calculations.

We expect the coefficient in the second column to be larger than in the first column. In Columns 3 and 4 we estimate OLS regressions with the same left-hand-side variable (hours worked) and discretion and controls in the right-hand side, distinguishing between employees without (Column 3) and with (Column 4) performance pay. For men, the results are indeed consistent with our hypothesis: it can be seen that incentive pay has a larger effect on work hours when the employee has discretion, and discretion has a larger effect on work hours for employees who have an incentive contract. However, for women we find that the coefficient of discretion (in Columns 3 and 4) is insignificant no matter whether employees have performance pay, and the coefficient of performance pay is positive when employees do not have discretion (Column 1) and statistically insignificant otherwise.

Our estimation strategy proceeds as follows. First, we divide the data into four categories: employees without discretion, employees with discretion, employees without an incentive contract, and employees with an incentive contract. Second, we estimate the effect of incentive pay on work and non-work activities for each of the first two categories of employees, and the effect of discretion on work and non-work activities for the other two categories. Third, we compute the difference between the coefficients for incentive pay in the first two categories and, similarly, we compute the difference between the coefficients for discretion in the two remaining categories. We expect the coefficient of incentive pay to be larger for employees who have discretion than for employees who do not have discretion, and the discretion coefficient to be larger for those who have an incentive contract than for those who earn a straight salary. Since we want to test for the statistical significance of these differences, instead of estimating these

four regressions separately and for different subsamples, we separately estimate the following two equations on the whole sample:

$$(3) \quad A_i = a_1 + \beta_1 I_i + \theta_1 X_i + \gamma_1 D_i + \delta_1 D_i I_i + \lambda_1 D_i X_i + e_{1i}$$

$$(4) \quad A_i = a_2 + \beta_2 D_i + \theta_2 X_i + \gamma_2 I_i + \delta_2 D_i I_i + \lambda_2 I_i X_i + e_{2i}$$

where I and D are the dichotomous variables for incentive pay and discretion, respectively, and X are the same control variables used in the previous section, namely: household size, small children, main income earner, married, part-time contract, permanent contract, age, age squared, twenty-six country dummies, eight occupation dummies, eleven industry dummies, eleven net income dummies, and seven establishment size dummies. The coefficient δ_1 captures the change in the incentive pay coefficient when employees are given discretion, i.e. the effect of moving from $I = 0$ to $I = 1$ when $D = 1$; whereas δ_2 captures the change in the discretion coefficient when employees are given performance pay, i.e. the effect of moving from $D = 0$ to $D = 1$ when $I = 1$. In terms of the model, δ_1 provides an estimate of $\{[A^{pp}(0) - A^s(0)] - [A^{pp}(\underline{e}) - A^s(\underline{e})]\}$ and δ_2 gives an estimate of $\{[A^{pp}(0) - A^{pp}(\underline{e})] - [A^s(0) - A^s(\underline{e})]\}$.

Moreover, suppose in the model that performance pay can only lead to a change in time spent on non-work activities if the employee can actually influence her working hours. In that case, if the employee does not have discretion time spent on non-work activities will be the same no matter whether she has an incentive contract or not. Hence in the model $A^{pp}(\underline{e}) = A^s(\underline{e})$ and the two differences can be further simplified to

$$(5) \quad \begin{aligned} & [A^{pp}(0) - A^s(0)] - [A^{pp}(\underline{e}) - A^s(\underline{e})] = \\ & = \{[A^{pp}(0) - A^{pp}(\underline{e})] - [A^s(0) - A^s(\underline{e})]\} = A^{pp}(0) - A^s(0) \end{aligned}$$

where $[A^{pp}(0) - A^s(0)]$ is the substitution effect defined in Section 2, i.e. the effect of performance pay on time use conditional on the employee being able to influence her working hours. In other words, we can interpret the coefficients δ_1 and δ_2 in equations (3) and (4) as two alternative measures of the substitution effect.¹⁵

Results from this estimation approach are reported in Tables 9-14. As in the previous section, we estimate separate regressions for men and women, using systems of seemingly unrelated regression equations.¹⁶ In Table 9 we can see a negative relation between performance pay and men's leisure, and also between performance pay and women's charitable and political activities. These coefficients suggest very large effects: for men's leisure, the size is equivalent to

¹⁵ Since equations (3) and (4) are estimated separately, we cannot test whether our estimates of δ_1 and δ_2 are significantly different from each other.

¹⁶ We do not use ordered probit or censored regression methods because we want to be able to obtain estimates of the "substitution effect", as defined in the text. Moreover, notice that almost all the right-hand-side variables that we use are dichotomous or discrete (as a matter of fact, age and age squared are the only continuous variables). In such cases the linearity assumption implied by OLS is not as restrictive as in the cases in which the right-hand-side variables are mostly continuous.

about an hour per week, which amounts to a 22-percent reduction for the average man in the sample; and for women’s charitable and political activities the size is equivalent to eighteen minutes per week, or a 90-percent reduction for the average woman in the sample.

Table 9
Estimates of substitution effect of performance pay on the annual number of hours spent on different activities (seemingly unrelated regressions)

	Men		Woman	
	(1)	(2)	(3)	(4)
Housework	-28.045 (26.937)	-7.826 (27.573)	-45.576 (33.834)	-2.312 (33.849)
Familycare	3.874 (18.103)	6.623 (18.572)	-3.266 (24.254)	20.420 (24.283)
Charipol	-6.724 (6.827)	-5.122 (6.893)	-15.277 ** (6.936)	-9.466 (6.948)
Leisure	-58.343 *** (21.951)	-59.407 *** (22.572)	-10.816 (24.781)	-29.719 (24.842)

Note. Standard errors are shown in parentheses. Levels of significance: (***) 1 percent; (**) 5 percent; (*) 10 percent. Columns 1 and 3: OLS estimates of δ_1 (equation 14). Columns 2 and 4: OLS estimates of δ_2 (equation 15). Both δ_1 and δ_2 are estimates of the substitution effect of performance pay on the number of hours per year dedicated to different activities. Specifically, δ_1 is the effect of performance pay on the amount of time spent on different activities for employees who have discretion to choose their work hours; whereas δ_2 is the effect of discretion over work hours on the amount of time spent on different activities for employees who are on a performance pay contract. In Columns 1 and 3 the left-hand-side variables are the time variables and the right-hand side variables are: performance pay, household size, small children, main income earner, married, part-time contract, permanent contract, age, age squared, 26 country dummies, 8 occupation dummies, 11 industry dummies, 11 net income dummies, 7 establishment size dummies, and a constant; and interactions between all these variables and discretion over work hours. In this regression, δ_1 is the coefficient of the interaction term discretion \times performance pay. In Columns 2 and 4 the left-hand-side variables are the time variables and the right-hand side variables are: discretion over work hours, household size, small children, main income earner, married, part-time contract, permanent contract, age, age squared, 26 country dummies, 8 occupation dummies, 11 industry dummies, 11 net income dummies, 7 establishment size dummies, and a constant; and interactions between all these variables and performance pay. In this regression, δ_2 is the coefficient of the interaction term discretion \times performance pay.

Source: European Working Conditions Survey 2000/01, own calculations.

Moreover, note that none of the estimates reported in Table 5 were significant. Since those estimates can be interpreted as the “total effect” of performance pay on different activities, the combined results of Tables 5 and 9 suggest that the negative substitution effect that we find for some non-work activities is being offset by a positive discretion effect. In Table 10 we have also estimated the same regressions using time shares instead of the measures of total time spent, and the signs and significance of the coefficients remain unchanged: for men, we find a negative substitution effect for leisure, and for women we find a negative substitution effect for charitable and political activities. We also find a negative effect for women’s housework.

In Table 11, we add to the system of equations for non-work activities a regression with hours worked as left-hand-side variable. Estimates suggest a positive effect for men, and no significant effect for women.

Table 10
Estimates of substitution effect of performance pay on time shares of different activities (seemingly unrelated regressions)

	Men		Women	
	(1)	(2)	(3)	(4)
Housework share	-0.009 (.007)	-0.007 (.007)	-0.016 * (.009)	-0.007 (.009)
Familycare share	.002 (.005)	.003 (.005)	.004 (.006)	.009 (.006)
Charipol share	-0.002 (.002)	-0.001 (.002)	-0.004 ** (.002)	-0.002 (.002)
Leisure share	-0.17 *** (.006)	-0.015 *** (.006)	.002 (.006)	-0.006 (.006)

Note. Standard errors are shown in parentheses. Levels of significance: (***) 1 percent; (**) 5 percent; (*) 10 percent. The meaning of Columns 1-4 is the same as the respective Columns of Table 9, except for the fact that the estimates come from regressions in which the left-hand-side variables are the fractions of time spent on different activities. The right-hand-side variables of these regressions are the same as in Table 9.

Source: European Working Conditions Survey 2000/01, own calculations.

Table 11
Estimates of substitution effect of performance pay on the annual number of hours spent on different activities (seemingly unrelated regressions)

	Men		Woman	
	(1)	(2)	(3)	(4)
Housework	-34.157 (27.130)	-88.348 (56.100)	-49.983 (34.104)	-65.070 (65.579)
Familycare	4.080 (18.235)	17.288 (24.504)	-2.665 (24.406)	-55.717 (43.369)
Charipol	-7.103 (6.884)	-2.156 (12.855)	-14.511 ** (6.898)	-16.360 (11.740)
Leisure	-60.325 *** (22.113)	-20.134 (49.834)	-6.103 (24.883)	-5.762 (48.775)
Work	68.434 ** (29.969)	30.635 (58.714)	-25.625 (36.696)	66.438 (70.342)

Note. Standard errors are shown in parentheses. Levels of significance: (***) 1 percent; (**) 5 percent; (*) 10 percent. Same regressions as in Table 9, except for the fact that the annual number of hours worked is also used as a left-hand-side variable.

Source: European Working Conditions Survey 2000/01, own calculations.

The effect on men's working hours is equivalent to 85 minutes per week, or a 3-percent increase in hours worked for the average man in the sample.

Next, we estimate the substitution effects separately for different sets of individuals: those who live or do not live alone (Table 12); those who are or are not the main income earner in the household (Table 13); and individuals with and without small children (Table 14). When we separate the sample according to whether the individual lives alone, we find that for men who

do not live alone performance pay is associated with a reduction in leisure of about 69 to 83 minutes per week (equivalent to a 26 to 31-percent reduction for the average male individual who does not live alone) and an increase in hours worked of about 83 minutes per week (equivalent to a 2-percent increase for the average employee). As far as women are concerned, for those who do not live alone we find a negative effect on charitable and political activities equivalent to 20 minutes per week (104 percent for the average female employee in the group). Moreover, our estimates show that the relation between performance pay and hours worked is positive for women who live alone and negative otherwise. For female employees who live alone, incentive pay is associated with a weekly increase in work hours of 157 minutes, which is equivalent to a 4-percent increase. However, for women who do not live alone we find a reduction in work hours of about 110 minutes per week, which amounts to a 2-percent reduction for the average employee in the relevant group.

Table 12
Estimates of substitution effect of performance pay on the annual number of hours spent on different activities (seemingly unrelated regressions)

	Employees living alone				Employees not living alone			
	Men		Women		Men		Women	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Housework	-88.348 (56.100)	-28.525 (59.712)	-65.070 (65.579)	-23.625 (66.813)	-16.029 (29.118)	-3.332 (30.178)	-22.252 (37.955)	36.507 (38.621)
Familycare	17.288 (24.504)	1.907 (24.241)	-55.717 (43.369)	-1.842 (43.965)	6.313 (22.816)	17.716 (23.668)	20.013 (29.082)	39.900 (29.647)
Charipol	-2.156 (12.855)	-3.870 (13.711)	-16.360 (11.740)	-5.792 (12.025)	-7.369 (8.174)	-5.160 (8.441)	-17.158 ** (8.594)	-12.416 (8.748)
Leisure	-20.134 (49.834)	-63.801 (53.623)	-5.762 (48.775)	7.421 (49.643)	-72.456 *** (24.174)	-60.196 ** (25.064)	-11.387 (28.815)	-26.268 (29.457)
Work	30.635 (58.714)	-64.938 (64.024)	66.438 (70.342)	125.579 * (71.695)	66.237 * (34.698)	37.735 (36.194)	-88.335 ** (43.186)	-64.762 (44.224)

Note. Standard errors are shown in parentheses. Levels of significance: (***) 1 percent; (**) 5 percent; (*) 10 percent. Regressions are the same as in Table 11, for different groups of employees.

Source: European Working Conditions Survey 2000/01, own calculations.

Table 13 reports estimates according to whether the respondent is or is not the main income earner in the household. As far as men are concerned, the increase in hours worked and the reduction in leisure are only significant when the individual is the main income earner, and the estimates are approximately equivalent to a 2-percent increase and a 23-percent reduction, respectively. For men who are not the main income earners, there are no significant effects on hours worked or leisure, but there is a significant effect on housework, which is equivalent to a 31-percent reduction. For women, the only significant effect that we find is for charitable and political activities of women who are not the main income earner, and the effect is sizeable, as in previous regressions. Finally, Table 14 shows results for employees with and without children below age fifteen.

Table 13
Estimates of substitution effect of performance pay on the annual number of hours spent on different activities (seemingly unrelated regressions)

	Employee is the main income earner in the household				Employee is not the main income earner in the household			
	Men		Women		Men		Women	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Housework	-22.324 (29.434)	-8.211 (30.090)	-50.635 (54.148)	-14.399 (55.8409)	-125.156 ** (62.368)	-27.298 (68.554)	-35.801 (44.122)	15.612 (44.936)
Familycare	12.814 (20.432)	11.744 (20.942)	-37.516 (38.813)	5.616 (40.0179)	-22.291 (39.229)	5.460 (43.247)	28.895 (31.312)	38.150 (31.952)
Charipol	-5.211 (7.853)	-2.489 (8.014)	-4.298 (11.406)	6.146 (11.813)	-6.777 (14.010)	-20.937 (15.425)	-21.679 ** (8.688)	-14.962 * (8.839)
Leisure	-59.860 ** (23.575)	-56.635 ** (24.2269)	-23.768 (38.654)	-58.479 (39.910)	-63.782 (59.675)	-82.241 (65.595)	13.936 (32.887)	13.160 (33.612)
Work	75.285 ** (32.083)	26.324 (33.083)	8.786 (59.556)	79.446 (61.308)	53.072 (79.917)	33.207 (88.100)	-46.359 (46.607)	-38.194 (47.992)

Note. Standard errors are shown in parentheses. Levels of significance: (***) 1 percent; (**) 5 percent; (*) 10 percent. Regressions are the same as in Table 11, for different groups of employees.

Source: European Working Conditions Survey 2000/01, own calculations.

Table 14
Estimates of substitution effect of performance pay on the annual number of hours spent on different activities (seemingly unrelated regressions) – Employees living with and without children (below age 15)

	Without children				With children			
	Men		Women		Men		Women	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Housework	-58.520 (39.107)	-21.535 (40.250)	-95.362 * (52.783)	-78.049 (53.753)	-67.540 (52.691)	-28.719 (56.206)	6.127 (62.024)	79.083 (67.040)
Familycare	5.961 (20.641)	-2.267 (21.299)	-24.045 (33.960)	-2.110 (34.552)	-36.449 (40.940)	-18.777 (43.820)	-28.196 (43.593)	38.158 (47.292)
Charipol	-11.560 (9.771)	-8.128 (9.996)	-25.246 ** (10.643)	-28.453 *** (10.801)	-10.518 (13.419)	5.477 (14.393)	10.830 (11.424)	-6.173 (12.222)
Leisure	-61.226 * (32.822)	-73.128 ** (33.990)	10.517 (39.272)	-13.875 (40.012)	-76.476 * (44.416)	-88.865 * (46.964)	7.298 (43.594)	-77.548 * (46.871)
Work	48.995 (40.445)	(15.995) (41.857)	19.535 (51.249)	66.786 (52.325)	92.136 (63.829)	98.567 (68.377)	-16.087 (74.870)	75.143 (81.237)

Note. Standard errors are shown in parentheses. Levels of significance: (***) 1 percent; (**) 5 percent; (*) 10 percent. Regressions are the same as in Table 11, for different groups of employees.

Source: European Working Conditions Survey 2000/01, own calculations.

The main difference we find between the two groups is that the reduction in women's charitable and political activities is only significant for women without small children.

6 Conclusions

While much research on incentive contracts has focused on their consequences for the performance of firms and how gains are shared with the employees, considerably less has been concerned with how increased use of performance pay affects the individuals' allocation of time in general and, in particular, time spent on non-work activities. On the one hand, performance pay can lead employees to spend more time at work so as to increase their performance and earn higher pay, which would lead to a reduction in time spent on non-work activities. Moreover, incentive contracts are often introduced as part of "empowerment" strategies, which imply that employees will not only have more incentives to spend more time at work, but will also have more freedom to do so. However, higher earnings obtained through longer work hours can be used to hire housework services in the market, thus leaving more time available for leisure even if more time is also spent at work. Therefore the overall effect of performance pay contracts on non-work activities is not necessarily clear.

The multi-task agency model that we propose shows that if performance pay and discretion are jointly introduced and work effort increases as a result, there will be an unambiguous reduction in housework and that, depending on the level of substitutability between work and housework, there might be a reduction or an increase in leisure. Specifically, leisure will diminish if substitutability is low, i.e. an increase in work effort does not have a large impact on the marginal cost of housework effort. We also use the model to show that the effect of introducing discretion and performance pay can be decomposed into a "substitution effect" (the effect of introducing performance pay when employees have discretion) and a "discretion effect" (the effect of introducing discretion when employees are paid a straight salary). We show that the substitution effect is always negative for housework and that it is negative for leisure if work-housework substitutability is low.

In our empirical analysis, we use information on performance pay, discretion, and hours worked and time spent on different non-work activities. Although the model only considers "housework" and "leisure", the information we take from the data is much more detailed and includes time spent in housework, taking care of children or relatives, charitable and political activities, and leisure. We conduct two empirical analyses. First of all, we estimate the total effect of performance pay on work and non-work activities. We find a positive relation between performance pay and men's working hours, equivalent to a 2-percent increase for the average employee; but no significant relation for women. As far as non-work activities are concerned, for most activities the relation with performance pay is not significant, but when it is significant, it is usually positive. For men we have found a positive relation of incentive contracts with time spent in child care, political activities and cultural activities; and for women we find a positive relation with leisure and time spent taking care of disabled and elderly relatives. The only negative relations we find are for men's cooking and women's housework.

The second empirical analysis exploits an interesting feature of the data – the information about discretion over work hours. We use a differences approach to estimate the substitution effect in

two ways: (a) the difference between the effect of performance pay on employees who have discretion over work hours and employees who do not have discretion; and (b) the difference between the effect of discretion on employees who have performance pay and employees who do not have performance pay. This approach relies on the idea that performance pay must have a larger effect on employee behavior when employees have more choice over work hours and, similarly, discretion must have a larger effect on behavior when employees have an incentive contract. The main findings are that for men, performance pay is associated with a small increase (3 percent) in hours worked and a relatively large reduction (22 percent) in leisure; whereas for women it is associated with a very large reduction (90 percent) in charitable and political activities. In summary, when the estimation approach takes into account that employee influence over working hours can vary, we find a negative relation between incentive pay and time spent on non-work activities.

The analysis also shows some variation in the substitution effect according to family characteristics. For male employees, the reduction in leisure and the increase in work hours are only significant when they do not live alone. In contrast, for female employees we find an increase in work hours for those who live alone and a reduction in work hours for those who do not live alone. We also find differences according to whether the employee has children or is the main income earner in the household. These results suggest that employees with different family environments adjust differently to incentive contracts.

Appendix

Part (a):

Under an incentive contract, the employee's certainty equivalent is

$$(A1) \quad \beta + ae - px + B(h+x) + F(1-e-h) - g(e,h) - (r/2)a^2\sigma^2$$

and maximizing with respect to e , h and x yields the following first-order conditions:

$$(A2) \quad a - F'(1-e-h) - g_1(e,h) = 0$$

$$(A3) \quad B'(h+x) - F'(1-e-h) - g_2(e,h) = 0$$

$$(A4) \quad -p + B'(h+x) = 0,$$

where g_1 and g_2 are the first partial derivatives of g with respect to the first and second arguments respectively. Combining (A3) and (A4), we obtain

$$(A5) \quad a = F'(1-e^{pp} - h^{pp}) + g_1(e^{pp}, h^{pp})$$

$$(A6) \quad p = F'(1-e^{pp} - h^{pp}) + g_2(e^{pp}, h^{pp})$$

On the other hand, under a salary system, $a = 0$ and the employee will choose the minimum work effort allowed (\underline{e}). Therefore:

$$(A7) \quad 0 < F'(1-\underline{e} - h^s) + g_1(\underline{e}, h^s)$$

$$(A8) \quad p = F'(1-\underline{e} - h^s) + g_2(\underline{e}, h^s).$$

Since $e^{pp} > \underline{e}$, equations (A6) and (A8) imply that $h^{pp} < h^s$ (a negative total effect). Moreover, (A8) implies that a reduction in e raises h^s , which implies $h^s < h^s(0)$ (a positive discretion effect). Since $h^{pp} < h^s$, this also implies $h^{pp} < h^s(0)$ (a negative substitution effect).

Part (b):

Since $L = 1 - e - h$, the total effect is negative $L^{pp} < L^s$ if and only if

$$(A9) \quad e^{pp} - \underline{e} > h^s - h^{pp}.$$

On the other hand, combining (A6) and (A8),

$$F'(L^{pp}) - F'(L^s) = g_2(\underline{e}, h^s) - g_2(e^{pp}, h^{pp}) = \gamma(h^s - h^{pp}) - \kappa(e^{pp} - \underline{e}).$$

Therefore the total effect is negative if and only if

$$(A10) \quad \kappa(e^{pp} - \underline{e}) < \gamma(h^s - h^{pp}).$$

Conditions (A9) and (A10) are jointly met if and only if $\kappa < \gamma$. Hence the total effect is negative in that parameter range. Using analogous reasoning, it follows that the discretion and substitution effects are respectively positive $L^s < L^s(0)$ and negative $L^{pp} < L^s(0)$ if and only if $\kappa < \gamma$.

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