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# **Informal help in the workplace: Analysis from a matched employer-employee data set**

Meriem Bouamoud (GATE – University of Lyon 2)

Marc-Arthur Diaye (CEE and TEPP)

Emmanuelle Walkowiak, (University of East-Paris, and CEE)

# PLAN

- Motivation
- Empirical analysis
- Results



# MOTIVATION

# Motivation

- Most of the few papers (in economics and in sociology) dealing with helping effort in the workplace, conclude that it is profitable for firms.
- If help among employees is profitable for firms, why do firms not fully formalize help among their employees ?
- So if help is not fully formalized by firms then since help is costly for the one who helps and since there is no official recognition (by firms) of this unofficial help, why do workers help one another ?

# Motivation

- The obvious and usual answer is to say that by helping other employees, workers simply express their (class, gender, ethnic, etc...) solidarity in the workplace.
- We argue that this story is not completely true.
- **We argue that by helping other employees, workers mainly obey to an organizational design set up by firms in order to incite workers to help one another.**

# Motivation

- By using the Al-Najjar, Anderlini and Felli (2006)'s definition of descriptability/undescribability, we argue that firms do so because any task in the workplace has a describable dimension and a undescribable one.
- While the describable dimension of a task can be contractualised by the Principal, the undescribable dimension cannot.
- However both dimensions have an influence on the probability of task success, hence on firms' expected profit and on workers expected utility.

# Motivation

Task



Describable part

Undescribable part

# Motivation

- Thus by incite (through the organizational design) workers to help each other firms actually reduce the negative impact of the undescribable dimension of tasks on their expected profit,
- and by helping each other workers reduce the negative impact of the undescribable dimension of tasks on their expected utility.

# Motivation

- $h_o$  and  $h_r$  depend on:
  - a vector  $CH_1$  of the worker's characteristics out of the workplace (like age, sex, diploma, ethnicity,...),
  - a vector  $CH_2$  of the worker's characteristics in the workplace (like the occupation in the workplace, the use of IT,...)
  - and a vector  $CH_3$  of the firm's characteristics (like the industrial sector, the organisational design, the incentive design,...)

# Motivation

Let us briefly describe the timing of the contract for any Agent:

1. *The Principal constructs the contract.*
2. *The Agent signs the contract with the Principal.*
3. *Production starts.*
4. *The Agent observes an UD aspect of his task and check if he can solve it or not.*
5. *If he can solve it, then he provides effort, nature plays ( $X=1$  or  $0$ ) and payoff are delivered.*
6. *If he cannot then he decides whether or not to join an informal help network:*  
$$E[U(w, k, h_o, h_r)] \geq E[\hat{U}(w, k)]$$
*We assume that the Agent knows  $h_r$  and  $h_o$  before taking his decision.*
7. *If he does not join an informal help network, then he provides effort, nature plays ( $X=1$  or  $0$ ) and payoff are delivered.*
8. *If he does join an informal help network, then he provides effort, receives help, provides eventually help to another worker, nature plays ( $X=1$  or  $0$ ) and payoff are delivered.*

# Motivation

- **Related literature:**
- Industrial sociology:
  - Roy 1954, 1959;
  - Gross 1953
- Economics:
  - Itoh (1991),
  - Ichniowski and Shaw (2005),
  - Drago and Garvey (1998).



# Empirical Analysis



# Empirical analysis

Let us remind that we want to answer to the question whether informal help network in the workplace mainly depends on firms' organizational design or not.

# Empirical analysis

- $h_0$  and  $h_r$  depend on:
  - a vector  $CH_1$  of the worker's characteristics out of the workplace,
  - a vector  $CH_2$  of the worker's characteristics in the workplace,
  - and a vector  $CH_3$  of the firm's characteristics.

## Empirical analysis

- In the data set that we use, we do not observe  $h_o$ .
- However we observe  $h_r$ .
- 
- $Net_i = 1$  if the worker  $i$  is observed being helped by other employees ( $h_r \neq 0$ ) and  $Net_i = 0$  otherwise.
- 
- $Net_i=1$ : Worker  $i$  belongs to an informal help network.

# Empirical analysis

- $Net_i$  is a dummy variable.
- Logistic regression in order to estimate the determinants of informal help network membership.
- We expect to find empirically that  $CH_2$  and  $CH_3$  have much more influence over  $Pr(Net_i = 1)$  than  $CH_1$ .



# Empirical analysis

- Selection effects

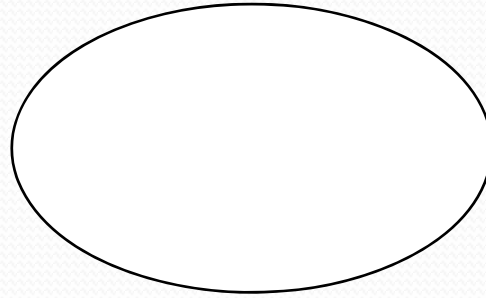


# Empirical Analysis

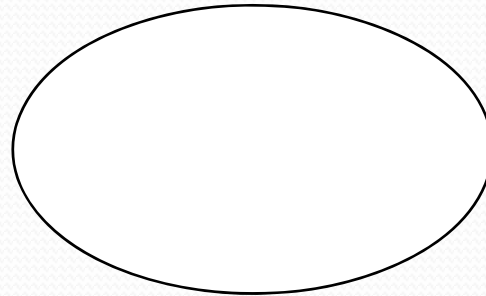
**Q1: In terms of effort, is it the case that there is a “positive assortative matching” between informal help network members ?**

# Empirical Analysis

Network 1 for good  
workers



Network 2 for less  
good workers



# Empirical Analysis

- No direct effect of informal help network membership over the workers' effort.
  - Indirect effect of informal team membership over the workers' effort through a selection effect.
- informal help network attracts workers having a low-disutility of effort.

# Empirical Analysis

**Q2: What is the effect of informal help network membership on individual wage ?**

- According to our formal framework, wages do not depend on informal help. Hence being a member of an informal help network *has no direct effect* on the employees' individual wage.

# Empirical Analysis

- However according to  $Q_1$ , workers who belong to an informal help network have a low-disutility of effort.
- Such workers provide an effort higher than “ $e$ ” the effort designed by the Principal.
- This extra-effort will have a positive impact on the probability of success of the task.
- Since this probability is also for each employee the probability to get his wage, it implies that the *expected wage* of individuals who belong to an informal help network is higher than the one of individuals who do not.
- As a consequence, the wage of individuals who belong to informal help networks is *on average* higher than the wage of those who do not.

# Empirical Analysis

- **Data:** a matched employer/employee survey on « computerization and organizational change », COI, 1997 / DADS
- 2511 firms
- 4435 employees



# The variables



➤ **Communication variables:**

→ *Formal Communication* : give and receive indications.

→ *Informal Communication*: receive help.

→ *Pure Informal Communication*: the part on informal communication not correlated with formal communication.

➤ **Effort:**

→ *Productive effort*

→ *Cognitive effort*

➤ **Wage**

➤ **Team/Individual work**

# Informal communication

- The informal communication variable is based on two questions.
- The first one is: *If you have a temporary excess workload or if you are uneasy with a difficult or tricky task, are you helped by? :*
  - (a) *Your supervisor*
  - (b) *Colleagues you usually work with*
  - (c) *Other persons in the firm*
  - (d) *Persons from outside the firm.*

# Informal communication

- The second question is : *Do the following persons bring you a help, information, in the use of the computing?*
  - (a) *Your superiors*
  - (b) *Your subordinates*
  - (c) *Colleagues you usually work with*
  - (d) *Your firm's computing service*
  - (e) *Other persons in your firm*
  - (f) *Persons from companies specialized in computing*
  - (g) *Other persons from outside the firm.*

# Informal communication

- From the answer to these two questions, we state four dummies:
  - The first dummy is equal to one if the answer to the first question is a) or the answer to the second question is a) or b).
  - The second dummy is equal to one if the answer to the first question is b) or the answer to the second question is c).
  - The third dummy is equal to one is if the answer to the first question is c) or the answer to the second question is d) or e).
  - The fourth dummy is equal to one if the answer to the first question is d) or the answer to the second question is f) or g).

# Informal communication

- We then define informal communication as the sum of dummies.
- It takes values from 0 to 4.
- A value of 0 means here that the employee does not communicate informally at all.

# Informal/Formal communication

**Table 1. Frequency of Formal / Informal communication**

	<i>Formal communication</i>		<i>Informal communication</i>	
<i>Modality</i>	<b>Frequency</b>	<b>Percent</b>	<b>Frequency</b>	<b>Percent</b>
<i>0</i>	466	10.51	432	9.74
<i>1</i>	943	21.26	894	20.16
<i>2</i>	1158	26.11	1195	26.94
<i>3</i>	1085	24.46	1212	27.33
<i>4</i>	783	17.66	702	15.83
<i>Total</i>	4435	100	4435	100

# Pure informal communication

- $\text{CORR}(\text{formal communication, informal communication}) = .441 (***)$ .
- A reason could be that if an employee needs to be helped over some aspects of his task, he can ask for help from an employee he usually communicates formally with.
- In order to isolate the *pure informal part of informal communication*, we construct an indicator called *pure informal communication* which represents the predicted positive residuals obtained from the regression of informal communication over formal communication.

# Pure informal communication

- Pure informal communication represents the part of informal communication which is not correlated with formal communication.
- We use this binary variable in order to define *informal help network membership*.

# Pure informal communication

Table 2. Frequency of Pure Informal communication

	<i>Pure Informal communication</i>	
<i>Modality</i>	<i>Frequency</i>	<i>Percent</i>
<i>0</i>	2086	47.03
<i>1</i>	2,349	52.97
<i>Total</i>	4435	100

# Teamwork / Individual work

- This teamwork measure is constructed from the following two questions.
- 
- The first question is: *Do you sometimes do your work in group or collectively? (yes/no).*
- The second question is: *If yes “How much of your working time do you work in group or collectively?”*
  - *Almost all time,*
  - *more than a quarter of your time,*
  - *less than a quarter of your time.*

# Teamwork / Individual work

- Then teamwork measure is a dummy variable equal to 1 when the answer to the first question is “yes” and the answer to the second question is almost all time or more than a quarter of time.

# Teamwork / Individual work

Table 3. Communication in individual and team works

	<i>Informal communication</i>	<i>Pure informal communication</i>	Number of Observation
<i>Individual Work</i>	2.083	.500	2945
<i>Team Work</i>	2.407	.587	1490
<i>Mean differences</i>	-.323***	-.087***	

\*\*\* = significant at 1%

# Effort variable

- Two measures:
  - Effort 1 : productive effort
  - Effort 2 : cognitive effort
- Productive effort is measured through two questions indicating if the employee works longer than the usual hours some days or some weeks.
- Productive effort = 2 if the employee increases hours worked for personal reasons.
- Productive effort = 1 if the employee increases hours worked in response to the firm's demand.
- Productive effort = 0 if the employee never works more than the usual number of hours.

# Effort variable

**Table 4. Frequency of Productive Effort**

	<i>Individual Work</i>		<i>Teamwork</i>	
<i>Modality</i>	<b>Frequency</b>	<b>Percent</b>	<b>Frequency</b>	<b>Percent</b>
<i>0</i>	1314	44.61	629	42.21
<i>1</i>	1372	46.58	735	49.32
<i>2</i>	259	8.81	126	8.47
<i>Total</i>	2945	100	1490	100



# Effort variable

- The cognitive effort indicator is a binary variable indicating if the employee makes propositions to improve his work stations, the production process or the machines.
- It measures an involvement in collective knowledge building about productive activity.

# Effort variable

Table 5. Frequency of Cognitive Effort

	<i>Individual Work</i>		<i>Teamwork</i>	
<i>Modality</i>	<i>Frequency</i>	<i>Percent</i>	<i>Frequency</i>	<i>Percent</i>
<i>0</i>	1091	37.04	414	27.78
<i>1</i>	1854	62.96	1076	72.22
<i>Total</i>	2945	100	1490	100

# Empirical Analysis

## The propensity score method

1. Analysis of the determinants of pure informal communication : (Logit models):
  - Employees' characteristic
  - Firms' characteristic
2. Treatment effect: let  $TT$  a dummy variable of pure informal communication (receiving help) and  $y$  the outcome variable:

$$y = TT y_1 + (1-TT) y_0$$

The causal effect of the treatment is given by:

$C = E(y_1 - y_0)$ : the average causal effect identified in the population

$C_1 = E(y_1 - y_0 / TT=1)$ : the average treatment effect over the treated individuals

$C_0 = E(y_1 - y_0 / TT=0)$  : the average treatment effect over the non-treated individuals

We note  $\bar{y}_1 - \bar{y}_0$  : the average difference between treated and non-treated individuals (naive estimate)



# RESULTS

# Results: *The determinants of Pure Informal Communication (Logit)*

Variables	Individual work	Teamwork
<b>Workers Characteristics</b>		
Gender (ref: men)	-0.083 (0.102)	0.015 (0.150)
Age	-0.000 (0.042)	-0.017 (0.065)
Age squared	-0.000 (0.000)	0.000 (0.000)
<b>Level of education (ref: 3years and more of tertiary education)</b>		
No diploma	-0.093 (0.243)	-0.140 (0.387)
Basic education diploma	-0.159 (0.242)	0.194 (0.398)
High school diploma	-0.168 (0.207)	0.149 (0.357)
College diploma	-0.026 (0.219)	0.350 (0.388)
1 or 2 years undergraduate studies	-0.175 (0.211)	0.016 (0.357)
<b>Professional type (ref : Executives)</b>		
Middle management	-0.019 (0.161)	-0.380 (0.313)
Clerck	0.253 (0.210)	-0.705 (0.500)
Skilled blue collar	0.036 (0.190)	-0.688** (0.351)
unskilled blue collar	0.167 (0.217)	-0.464 (0.381)
Seniority	0.002 (0.017)	-0.005 (0.027)
Seniority squared	0.000 (0.000)	-0.000 (0.000)
Chief	0.303*** (0.114)	0.053 (0.155)
Receiving a training for the workstation	0.432*** (0.089)	0.118 (0.131)
Intensity of industrial and commercial constraints	0.255*** (0.093)	0.236* (0.128)
Use of microcomputer	1.548*** (0.104)	1.585*** (0.156)
Training others employees for the workstation	0.079 (0.088)	0.129 (0.138)
Use of machine	0.050 (0.100)	-0.145 (0.130)

Evaluation interview	0.233* (0.089)	-0.022 (0.129)
<b>Firms Characteristics</b>		
<b>Firm size (ref : 50 to 99)</b>		
100 to 499	-0.055 (0.109)	0.134 (0.163)
500 to 999	0.166 (0.133)	0.032 (0.196)
1000 and more	0.100 (0.154)	0.300 (0.225)
<b>Number of hierarchical level (ref : 4)</b>		
0 to 2	-0.010 (0.129)	-0.209 (0.190)
3	-0.170 (0.118)	-0.034 (0.167)
5 to 9	0.085 (0.113)	0.237 (0.165)
<b>Industry sector (ref : automobile industry)</b>		
Food industries	0.146 (0.231)	0.892*** (0.333)
Consumer goods industry	0.015 (0.219)	0.708** (0.321)
Equipment goods industry	0.215 (0.217)	0.399 (0.315)
Intermediary goods industry	-0.065 (0.208)	0.419 (0.299)
Rural firm	0.045 (0.097)	0.014 (0.134)
Constant	-0.988 (0.893)	-0.312 (1.313)
Observations	2945	1490
Pseudo-R2	0.143	0.165

Standard errors in parentheses; \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

## Results: *Productive effort*

	<b>Individual work</b>	<b>Teamwork</b>
<i>Average effort</i>	0.641	0.662
<i>Average difference H/NH</i>	0.160***	0.188***
<i>Effect of the treated (C1)</i>	0.031	0.078*
<i>Effect on the non-treated (C0)</i>	0.055**	0.083**
<i>Global effect (C)</i>	0.043*	0.080**

- In teamwork or in individual work, on average employees who are helped provide a higher effort than the one of employees who are not helped.
- received help and own effort are not substitutes.
- The effort differential between employees who are helped and employees who are not helped is no more significant in individual work and weaker and less significant (at 10% comparing to 1% for the naïve estimate) in teamwork.
- In individual work and in teamwork, 100% and 58,51% respectively of the effort differential is explained by selection effects.

# Results: *Cognitive effort*

	<b>Individual work</b>	<b>Teamwork</b>
<i>Average productive effort</i>	0.629	0.722
<i>Average difference H/NH</i>	0.098***	0.109***
<i>Effect of the treated (C1)</i>	0.024**	0.006
<i>Effect on the non-treated (C0)</i>	-0.012	-0.018
<i>Global effect (C)</i>	0.005	-0.003

- In teamwork or in individual work, on average employees who are helped provide a cognitive effort higher than the one of employees who are not helped.
- The cognitive effort differential between employees who are helped and employees who are not helped is explained at 100% by selection effects in teamwork and at 75,51% by selection effects in individual

# Results: Wages

	Individual work	Teamwork
<i>Average wage</i>	9.695	9.770
<i>Average difference H/NH</i>	0.153***	0.263***
<i>Effect of the treated (C1)</i>	-0.002	0.064 **
<i>Effect on the non-treated (C0)</i>	-0.011	0.048 **
<i>Global effect (C)</i>	-0.007	0.057***

- In teamwork or in individual work, on average employees who are helped earn more than employees who are not helped.
- In individual work, when controlling for individual characteristics, the wage differential between employees who are helped and employees who are not helped is no more significant (C1).
- 100% of the wage differential is explained by selection effect: membership to informal team is not random and depends to individual characteristics.
- We reach the same conclusion concerning teamwork, except that in teamwork the selection effect accounts to about 75% ( $= 0.263 - 0.064 / 0.263$ ) of the wage differential, while direct effect of help accounts only to about 25%.



Preliminary paper

Thank you