An Initial Look at the Mondragon Worker Cooperatives

-Empirical evidences in employment adjustment and performance between worker cooperatives and conventional firms in the Spanish Basque area

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Introduction:

Although most firms in the business world are capitalist, an increasing number of firms are introducing profit sharing and employee involvement in management. Since worker co-operatives are firms that may be viewed as organizations that are entirely owned and controlled by their employees, it is no wonder that there is an increasing interest in the study of worker cooperatives: how they work, and how well they work.

The basic distinction between capitalist firms and worker cooperatives is the different types of ownership. Capital firms are firms in which those who supply the firm's capital manage the company (or select the managers) and enjoy the residual returns. Workers are hired-often indirectly-by those who provide the firm's capital. (Pencavel, et al, 2006) By contrast, worker cooperatives are owned and managed by their workers. In a worker cooperative, capital is borrowed from financial intermediaries or provided by the workers who act as holders of the equity. Ultimate managerial decisions in a co-op rest with the worker-owners.

The key questions of interest to economists are whether worker cooperatives, with such a distinct type of ownership, behave differently compared to conventional capitalist firms. In this paper, I primarily focus on how worker cooperatives react to output price changes in terms of wage and employment adjustment. I will also looks at how the two types of firms vary in their performances.

This paper uses a comprehensive panel dataset based on annual reports from firms in the Spanish Basque area. A most noticeable group of worker cooperatives in this area is the

Mondragon group, a highly developed worker cooperative system. In addition to studying the different behavior and outcomes between conventional capitalist firms and worker cooperatives, some special efforts are put into studying the effects of certain characteristics on performance within the Mondragon firms.

Literature Review

The study of worker cooperatives starts from Ward (1958). In his paper, he suggests that worker cooperatives aim at income maximization. A downside of this model is that, according to the model, when facing output price drops, worker cooperatives will cut employment in order to maximize income per worker, and therefore their output is lower. The negative slope of the supply curve had been in the center of disputes. In later studies, two main approaches had been taken to solve the disputes. One approach is to estimate the supply curve and to see if it has a negative slope. Another way is to provide an alternative model, in which employment adjustment is also a factor to consider when worker cooperatives make decisions (Kahana and Nitzan, 1989).

Although various theoretical studies exist, empirical findings are relatively limited. Among them are

-Craig and Pencaval (1992) regressed employment on output and input prices using a panel dataset of worker cooperatives and conventional firms in Plywood, and they found that “an increase in output prices for conventional firms was associated with an increase in

employment, working hours and output, but the increase had no significant effect on hourly incomes," while an "increase in output prices for WCs was not significantly correlated with employment and working hours, but affected hourly incomes positively."

-Pencavel et al. (2006) estimated models for "wages, employment, and capital" using a micro panel dataset of Northern Italian enterprises during the period 1982-1994. They concluded that wages in worker cooperatives, wages are more flexible while employment is less flexible.

-Burdin and Dean (2009) used a panel dataset based on the Uraguarian social security record to test the responses of worker cooperatives to exogenous shocks. They found that worker cooperatives display a well-defined and positive relationship between wages and employment, while the effect of output price changes on wage variations is large in worker cooperatives than in conventional firms.

This study will be a continuation of this stream of empirical works, with a focus on the Mondragon firms in the Basque area. In particular, I will follow Burdin and Dean (2009) and compare responses of the two types of firms, worker cooperatives and conventional firms, to output price changes. Besides, I will also be looking at the effect of membership ratio on these responses within the Mondragon firms, because the membership ratio shows the extent to which the idea of "worker cooperative" is enforced. These will be presented as Task I. Another interest of this research is to briefly compare the performance of worker cooperatives and conventional firms. This will be carried out in Task II.

Data Description

The dataset used for empirical analysis combines two primary datasets. The first dataset is a highly unbalanced panel dataset drawn from the Spanish social security records, covering annual reports statistics of 2306 conventional firms and 76 worker cooperatives (48 of which are Mondragon firms), spanning from the years 1995 to 2007. The second dataset is a much smaller dataset, also covering annual reports statistics, consisting of 100 Mondragon firms solely, covering the years 1994 to 2005 and provided by Mondragon (hereafter the Mondragon manufacturing dataset). Although a study simply based on the first dataset alone is doable, because of the unbalanced nature of this dataset, a combination of the two datasets will enlarge the size of the Mondragon samples and so the results could be more convincing.

To combine the two datasets, because the observations of Mondragon firms in the social security dataset cannot be matched with individual observations in the Mondragon manufacturing dataset, I simply replace the Mondragon cooperative observations in the social security dataset with all observations in the Mondragon manufacturing dataset, with corrections to some variables due to different definitions in the way the two datasets are setup. However, some modifications need to be made when combing the two datasets:

-Years 1994, 2006 and 2007 are dropped due to the mismatching of years between the two dataset.

-Because the two datasets contain slightly differed groups of variables, some variables are dropped, including DISTRICT (not included in the Mondragon-only dataset (the second dataset)). Therefore district-related hypothesis are not testable.

-Regarding the industry effects, some industries are dropped since there are no observations of worker cooperatives in these industries.

-When carrying out the second task, va (value added) for some firms are negative, so the corresponding lnva values are missing. In response to that, I manually corrected these negative numbers to very small positive numbers, and name the new variable vam (value added modified).

Table 1 summarizes the number of observations by years, for all types of firms

Table 1

Year	conventional	coop mcc	coop no mcc	Total
1995	574	70	5	649
1996	1,337	68	5	1,410
1997	1,443	67	7	1,517
1998	1,494	68	7	1,569
1999	1,580	70	8	1,658
2000	1,703	70	9	1,782
2001	1,811	71	22	1,904
2002	1,906	74	22	2,002
2003	1,974	77	6	2,057
2004	1,999	77	4	2,080
2005	2,029	82	2	2,113
Total	17,850	794	97	18,741

Table 2 summarizes the key variables in this study

	Table 2
firmcode	Code of the firm
anno	year
coop	dummy for worker cooperatives
mcc	dummy for Mondragon worker cooperatves
Ratiomembership	percentage of employees that are members (applies to Mondragon firms only)
labor_cost	total labor cost
wage	total labor cost divided by number of employees, real
labor	number of employees
deflactor	industry price index
chlnwage	annual change in wages (in log form)
chlnlabor	annual change in employment (in log form)
chlndeflactor	annual change in deflactor (in log form)
lnva	value added (in log form)
lnvam	value added modified (in log form)
lnsales	sales revenue (in log form)
lnlabor	number of employees (in log form)
lnlabor_2	square of lnlabor
lnta	total assets (in log form)
lnta_2	square of lnta
lnfa	fixed assets (in log form)
lnfa_2	square of lnfa
lnta_lnfa	product of lnta and lnfa

Table 3 provides descriptive statistics for key variables

Variable	Obs	Mean	Std. Dev.	Min	Max
labor	14823	60.72677	189.5915	3	4628
wage	14820	28.69733	9.090398	0	170.7
deflactor	18507	0.8997833	0.075367	0.744	1
fixed_assets	18098	3128.167	20809.05	0	10462
total_assets	17631	8060.371	34178.22	0	11820
value_added	18249	2485.433	9362.271	-204199	290134
vam	18249	2509.21	9155.457	2.45E-06	290134

Empirical Strategy:

The empirical strategy to carry out Task I is largely inherited from Burdin and Dean (2009). In order to find the elasticity of wage with respect to output price changes, they use the following specification:

$$\Delta \ln w_{it} = \Delta \ln w_{it-1}\alpha_0 + \Delta \ln w_{it-1}C_i\alpha_1 + \Delta \ln p_{it}\gamma_0 + \Delta \ln p_{it}C_i\gamma_1 + \omega_i + \upsilon_{it}$$

Where w_{it} is the real wage rate at year t for firm i, p_{it} denotes output price at year t for firm I, C_i being the coop dummy which equals 1 if the firm is a worker cooperative. Here a first difference equation is used to show how wage changes respond to output price changes on a yearly basis.

Similiarly, to find the elasticity of employment with respect to output price changes and wage rate changes, Burdin and Dean (2009) use the following specification:

$$\Delta \ln E_{it} = \Delta \ln E_{it-1}\alpha_0 + \Delta \ln E_{it-1}C_i\alpha_1 + \Delta \ln w_{it}\beta_0 + \Delta \ln w_{it}\beta_1 + \Delta \ln p_{it}\gamma_0 + \Delta \ln p_{it}C_i\gamma_1 + \omega_i + \upsilon_{it}$$

Here E_{it} represents the employment level of firm i at year t. This is also a first difference equation that shows the employment reponses to output price changes and real wage changes.

For additional controls, Burdin and Dean (2009) include other variables such as firm size, industry, regions and years.

This specification has the following merits:

Firstly, the model estimates the elasticities of employment and wages to price shocks. Since employment and wage adjustments are two most important actions that firms can take in

the labor market, this model answers the first question raised in this paper: how do firms react to outside changes? By comparing the significance and magnitudes of the elasticities in conventional firms and worker cooperatives, and moreover, between non-Mondragon worker cooperatives and Mondragon firms, I might be able to see the different reactions of firms.

Secondly, by using the fixed effect estimators, firm-specific effects can be controlled. This also helps solving the problems of lacking some variables such as DISTRICT. A drawback of the fixed effect estimators is that the industry specific effects are not observable. In this study, I include both the OLS estimates and the fixed-effect estimates.

A slight modification has been made to the regression to get rid of the extreme effects of very large firms and very small firms. The rule I used is excluding all firms with labor force size smaller than or equal to 10 or greater than 604 (the 1^{st} percentile and the 99^{th} percentile). I include both the original regression and the modified regression in this study. Furthermore, I deleted all observations with fixed assets or total assets equaling zero when carrying out the second task.

Therefore I can use the model provided by Burdin and Dean (2009) to test the following hypothesis for Task I:

Hypothesis I: Wages are more sensitive to changes in relative output prices in worker cooperatives than in conventional firms.

Hypothesis II: Changes in relative output price are positively correlated with employment in conventional firms, while employment responses would be less elastic in worker

cooperative. Moreover, I expect a negative wage-employment in conventional firms, while this relationship is indeterminate for WCs.

However, the dataset used for this study is highly unbalanced. Only 5 percent of all the observations are worker cooperatives. To correct for this skewness, this study takes another technical approach to the model by Burdin and Dean (2009), the propensity scoring matching method.

The propensity scoring matching method is a methodology attempting to provide unbiased estimation of treatment-effects. In this study, the treatment is coop. The propensity score here is defined as the conditional probability of receiving a treatment given pretreatment characteristics:

$$P(X) \equiv Pr(D=1|X) = E(D|X)$$

Where D={0,1} is the indicator of exposure to treatment and X is the multidimensional vector of pretreatment characteristics. Given a population of observations denoted by I, if the propensity score p(Xi) is known, then the average effect of treatment on the treated (ATT) can be estimated as follows:

$$T \equiv E[E\{Y_{1i}|D_i = 1, p(X_i)\}-E\{Y_{0i}|D_i=0, p(X_i)\}|D_i=1]$$

Where the outer expectation is over the distribution of $(p(X_i)|D_i=1)$ and Y_{1i} and Y_{0i} are the potential outcomes in the two counterfactual situations of (respectively) treatment and no treatment.

Therefore the steps to find the treatment effect are:

i. Run logistic or probit regression model to obtain propensity score.

ii. Match each participant to one or more nonparticipants on propensity score.

iii. Multivariate analysis based on new sample.

Thanks to the pscore expansion pack for Stata, this whole procedure is doable in Stata with some simple commands. Therefore I can perform the propensity scoring matching method to our study. Although I am not able to test the effect of the treatment "coop" on the elasticities of wages and employment with respect to output price changes, it is valuable to see whether worker cooperatives tend to behave differently on key variables such as wage and size of employment. So a new hypothesis to test is:

Hypothesis III: worker cooperatives tend to have lower wages, but higher employment.

Another part of Task I is to look at the effect of membership ratio on the responsiveness of firms, by applying the same model to Mondragon firms only, and including the ratiomembership variable. It is expected that the higher the membership ratio, the less likely that employment will change with output price changes, while wages will float more to counter the effect of price changes (Burdin and Dean, 2009). Therefore,

Hypothesis IV: worker cooperatives with higher membership ratio will have higher changes in wage and lower changes in employment facing output price changes.

Besides, I also run some minor regressions that compare the determination of wages and employment between Mondragon firms and non-Mondragon firms, using the same models for the hypothesis before but replacing the coop dummy by the mcc dummy and limit the

dataset to worker cooperative observations only. The interest is to identify any possible systematic differences between the Mondragon type of worker cooperatives and other worker cooperatives. This regression is minor due to the understanding that the number of observation is very limited, so convincing and significant result is not anticipated.

To carry out Task II, I used the log form of the Cobb-Douglas production function:

$$\ln va_{it} = \ln K_{it} + \ln L_{it} + coop_i + \upsilon_{it}$$

However, because I am not sure about which would be the best measure of capital, I included fixed assets and total assets as alternative proxies for capital. Also rather than impose a particular functional form (the cob-douglas) I also estimate the translog form where the capital measures are included, together with their square terms, and their product with labor. The only hypothesis I are testing is that:

Hypothesis V: Worker cooperatives are doing better than conventional firms, in terms of performance.

As for the performance indicator, as explained in the dataset description section, I created a variable “vam”, value added modified, which correct for the negative value added terms. Because this artificial amendment might create bias in the outcome, I ran regression with both the value added (“va”) and the value added modified (“vam”).

Further, since the “coop” dummy variable will be omitted when performing a fixed effect model, I use the random effect regression to treat this panel dataset. I have also made similar

amendment to the dataset: excluding firms with size greater than 604 people or smaller than 11 people.

As an alternative approach for performance indicator, I used lnsales for a parallel regression in replacement of vam. Because sales figures are all positive, there is no concern of modification.

Results

The tables show the regression results for Task I.

In general, my modification to exclude extreme values does not make too much of difference. As for the hypothesis testing, in Table 4, the coefficients both on chlndeflactor and coop*chlndeflactor are highly insignificant at conventional levels of statistical significance. The coefficient on coop*chlndeflactor is positive, indicating that worker cooperatives are likely to have greater response in wages to the output price changes, though it is also statistically insignificant. Hence our findings do not provide support Hypothesis I.

For Hypothesis II, as shown in Table 5, the term chlnwage is highly significant with a negative sign, whereas its coop counterpart is insignificant. This support the Hypothesis II in the way that conventional firms cut employment facing wage rises, while worker cooperatives tend to preserve the level of employment. The terms chlndeflactor and coop*chlndeflactor are both insignificant, indicating that output price changes might not have any direct effects on the level of employment, no matter what the firm type is (conventional firms or worker cooperative).

For Hypothesis III, by using the propensity score matching method, I found that the average treatment effect of “coop” on wage is -0.005, with a t-statistics of -1.251. That is, with a low level of significance, worker cooperatives tend to set a lower wage than conventional firms. The average treatment effect of “coop” on employment is 0.008, with a t-statistics of 1.781. That is, worker cooperatives tend to preserve employment more than conventional firms do. This conclusion is limited by the relatively low level of significance.

For Hypothesis IV, as shown in Table 6, the “membershipratio” variable is significant in both the wage and labor regression models. For wage determination, it is expected that the higher the membership ratio, the more the wage will change in reaction to output price changes. For employment adjustments, it is expected that the higher the membership ratio, the less responsive the employment adjustment scheme will be.

For the minor regression that concerns the difference between Mondragon cooperatives and non-Mondragon cooperatives, the regression results show that there is high collinearity between within the dependent variables, as shown in Table 7. Therefore no evidence is found for differences between Mondragon cooperatives and non-Mondragon cooperatives.

For Task II, as shown in Table 8, the two different measures of value added results in very different outcomes. The dummy variable “coop” is insignificant in the original measure of value added, while in the vam regression it is significant, saying that worker cooperatives are actually performing worse compared to conventional firms. However, when the extreme values are eliminated, the variable “coop” becomes insignificant again. The likely reason for these differences is the effect of extreme values treatment, and due to the controversies in the

marginal treatments, it is not evidenced that the form of worker cooperative gives any advantages or disadvantages to the overall performance, when considering value added.

The story is entirely different when sales is used as the performance indicator. As shown in Table 9, the coefficient on coop is positive and highly significant. That is, worker cooperatives tend to have higher sales compared to conventional firms (when controlled for capital and labor), while the value added is not necessarily higher.

Conclusion and future research

This study uses a panel dataset for firms based in the Basque area to test diverse hypotheses concerning the behavior of worker cooperatives. We find that in worker cooperatives, employment is not correlated with wages, while in conventional firms, higher wage levels will cause firms to lay off workers. It is also found that worker cooperatives with higher membership ratio would be less likely to adjust employment but instead, more likely to adjust wages when facing output price changes. However, whether worker cooperatives and conventional firms differ in their responsiveness to price changes in terms of employment and wage adjustments remains unclear. Also, when value added is used to measure performance no evidence is found that these two types of firms differs in productivity. However, worker cooperatives tend to have higher sales than conventional firms when controlled for capital and labor.

There are still a lot of questions remained for future studies. Certainly, with the help of better techniques and a more complete, balanced dataset, more convincing conclusions could be drawn. Although I applied the propensity scoring method to compare the wage levels and employment levels between the two types of firms, I was unable to use this tool to test the differences in their elasticities. I could also compare the performances between Mondragon cooperatives and non-Mondragon cooperatives to see the collective power of the Mondragon firms as a group, given more observations of non-Mondragon cooperatives. Also, further work could be done to compare the performances between the two types of firms. For example, choosing sales instead of value added as the performance indicator. There are also other aspects about the worker cooperatives to look at, eg. inputs in technology, training, innovation, etc. At the same time, a closer look at the operation details of the Mondragon firms will be beneficial to explain some unexpected result in the studies.

Table 4

Without modification

Variables	**Coef.**	**t**	**P>|t|**
l.chlnwage	-0.31948	-30.51	0
l.coop*chlnwage	0.05312	0.71	0.477
chlndeflactor	-0.02189	-0.28	0.777
coop*chlndeflactor	0.146523	0.41	0.684
y2	(omitted)		
y3	0.008113	0.62	0.534
y4	(omitted)		
y5	-0.00437	-0.5	0.618
y6	0.010037	1.19	0.232
y7	0.017144	2.11	0.035
y8	-0.00401	-0.5	0.614
y9	-0.00246	-0.31	0.755
y10	-0.01688	-2.06	0.039
y11	-0.01309	-1.63	0.103
_con	0.063441	9.37	0

With modification

Variables	**Coef.**	**t**	**P>|t|**
l.chlnwage	-0.32024	-30.37	0
l.coop*chlnwage	0.050127	0.66	0.511
chlndeflactor	-0.00721	-0.09	0.926
coop*chlndeflactor	0.112667	0.29	0.769
y2	(omitted)		
y3	0.00899	0.68	0.499
y4	(omitted)		
y5	-0.00432	-0.49	0.626
y6	0.009409	1.1	0.269
y7	0.016887	2.05	0.04
y8	-0.0051	-0.63	0.527
y9	-0.00326	-0.41	0.682
y10	-0.01826	-2.2	0.028
y11	-0.01385	-1.7	0.09
_con	0.064013	9.32	0

Table 5

Without modification

Variables	**Coef.**	**t**	**P>|t|**
l.chlnlabor	-0.10134	-10.93	0
l.chcoop*lnlabor	0.197395	4.35	0
chlnwage	-0.55921	-59.91	0
coop*chlnwage	-0.04027	-0.59	0.554
chlndeflactor	0.052736	0.86	0.39
coop*chlndeflactor	-0.39024	-1.36	0.173
y2	(omitted)		
y3	-0.01666	-1.61	0.108
y4	(omitted)		
y5	-0.02108	-3.04	0.002
y6	-0.00728	-1.09	0.275
y7	-0.02229	-3.46	0.001
y8	-0.0461	-7.29	0
y9	-0.05152	-8.23	0
y10	-0.06728	-10.31	0
y11	-0.075	-11.71	0
_con	0.085412	15.85	0

With modification

Variables	**Coef.**	**t**	**P>|t|**
l.chlnlabor	-0.10177	-10.91	0
l.chcoop*lnlabor	0.190843	4.06	0
chlnwage	-0.56004	-59.65	0
coop*chlnwage	-0.05098	-0.73	0.464
chlndeflactor	0.053186	0.86	0.391
coop*chlndeflactor	-0.46976	-1.54	0.123
y2	(omitted)		
y3	-0.01873	-1.78	0.076
y4	(omitted)		
y5	-0.02094	-2.98	0.003
y6	-0.0079	-1.17	0.242
y7	-0.02222	-3.4	0.001
y8	-0.04678	-7.3	0
y9	-0.05202	-8.21	0
y10	-0.06823	-10.32	0
y11	-0.07553	-11.65	0
_con	0.086028	15.77	0

Table 6
Wage

Variables	Coef.	t	P>|t|
ratiomembership	0.167059	4.68	0
l.chlnwage	-0.23573	-5.45	0
chlndeflactor	0.187234	1	0.318
y2	(omitted)		
y3	(omitted)		
y4	-0.01106	-0.82	0.414
y5	-0.01966	-1.37	0.171
y6	-0.02429	-1.6	0.11
y7	-0.01333	-0.85	0.393
y8	-0.02038	-1.29	0.196
y9	-0.00882	-0.55	0.586
y10	-0.03874	-2.33	0.02
y11	-0.02367	-1.34	0.181
_cons	-0.13272	-1.23	0.218

Labor

Variables	Coef.	t	P>|t|
ratiomembership	-0.28017	-6.37	0
l.chlnlabor	-0.01039	-0.27	0.787
chlnwage	-0.5156	-9.64	0
chlndeflactor	-0.21528	-1	0.316
y2	(omitted)		
y3	(omitted)		
y4	0.002475	0.16	0.874
y5	-0.04863	-2.95	0.003
y6	-0.03552	-2.05	0.04

			1
y7	-0.073	-4.09	0
y8	-0.11023	-6.1	0
y9	-0.11338	-6.11	0
y10	-0.10438	-5.44	0
y11	-0.10553	-5.26	0
			0.50
_cons	-0.08048	-0.66	9

Table 7

Wage

Variables	**Coef.**	**t**	**P>|t|**
l.chlnwage	-0.23573	-5.45	0
l.mcc*chlnwage	(omitted)		
chlndeflactor	0.187234	1	0.318
mcc*chlndeflactor	(omitted)		
ratiomembership	0.167059	4.68	0
y2	(omitted)		
y3	(omitted)		
y4	-0.01106	-0.82	0.414
y5	-0.01966	-1.37	0.171
y6	-0.02429	-1.6	0.11
y7	-0.01333	-0.85	0.393
y8	-0.02038	-1.29	0.196
y9	-0.00882	-0.55	0.586
y10	-0.03874	-2.33	0.02
y11	-0.02367	-1.34	0.181
_con	-0.13272	-1.23	0.218

Labor

Variables	**Coef.**	**t**	**P>|t|**
l.chlnlabor	-0.01039	-0.27	0.787
l.mcc*chlnlabor	(omitted)		
chlnwage	-0.5156	-9.64	0
mcc*chlnwage	(omitted)		
chlndeflactor	-0.21528	-1	0.316
mcc*chlndeflactor	(omitted)		
ratiomembership	-0.28017	-0.62	0.535
y2	(omitted)		
y3	(omitted)		
y4	0.002475	0.16	0.874
y5	-0.04863	-2.95	0.003
y6	-0.03552	-2.05	0.041
y7	-0.073	-4.09	0
y8	-0.11023	-6.1	0
y9	-0.11338	-6.11	0
y10	-0.10438	-5.44	0
y11	-0.10553	-5.26	0
_con	-0.08048	-0.66	0.509

Table 8

Value Added

Variables	**Coef.**	**z**	**P>|z|**
coop	-0.02246	-0.83	0.404
lnlabor	0.525868	17.74	0
lnlabor^2	0.008768	2.25	0.024
lnta	0.438275	11.77	0
lnta^2	-0.01595	-4.53	0
lnta*lnfa	0.030652	7.41	0
lnfa	-0.13415	-6.32	0
lnfa^2	-0.00962	-6.18	0
y1	-0.14765	-11.58	0
y2	-0.13508	-14.88	0
y3	-0.12123	-13.66	0
y4	-0.08537	-10.32	0
y5	-0.07899	-10.14	0
y6	-0.05869	-7.98	0
y7	-0.03861	-5.48	0
y8	-0.03868	-5.62	0
y9	-0.02952	-4.34	0
y10	-0.01346	-2.01	0.045
_cons	2.427681	23.75	0

Value Added Modified

Variables	**Coef.**	**z**	**P>|z|**
coop	-0.09279	-2.23	0.026
lnlabor	0.577356	11.59	0
lnlabor^2	0.006837	1.05	0.294
lnta	0.555076	8.52	0
lnta^2	-0.02447	-3.94	0
lnta*lnfa	0.033395	4.56	0
lnfa	-0.11075	-2.97	0.003
lnfa^2	-0.01368	-4.93	0
y1	-0.15824	-6.81	0
y2	-0.16956	-10.27	0
y3	-0.13808	-8.53	0
y4	-0.09917	-6.56	0
y5	-0.08503	5.97	0
y6	-0.0685	-5.09	0
y7	-0.05744	-4.44	0
y8	-0.05331	-4.22	0

y9	-0.03938	-3.15	0
y10	-0.0316	-2.56	0.01
_cons	1.78823	10.18	0

Value Added Modified (controlled for firm size)

Variables	**Coef.**	**z**	**P>|z|**
coop	-0.01704	-2.23	0.026
lnlabor	0.566119	11.59	0
lnlabor^2	0.007197	1.05	0.294
lnta	0.586432	8.52	0
lnta^2	-0.02672	-3.94	0
lnta*lnfa	0.033964	4.56	0
lnfa	-0.11879	-2.97	0.003
lnfa^2	-0.01346	-4.93	0
y1	-0.16232	-6.81	0
y2	-0.17497	-10.27	0
y3	-0.14324	-8.53	0
y4	-0.10447	-6.56	0
y5	-0.08968	5.97	0
y6	-0.07182	-5.09	0
y7	-0.06003	-4.44	0
y8	-0.05642	-4.22	0
y9	-0.04262	-3.15	0
y10	-0.03496	-2.56	0.01
_cons	1.731148	10.18	0

Table 9
Sales

Variables	**Coef.**	**z**	**P>|z|**
coop	0.104286	3.05	0.002
lnlabor	0.319651	9.12	0
lnlabor^2	0.021291	4.61	0
lnta	0.72718	17.3	0
lnta^2	-0.23673	-9.7	0
lnta*lnfa	-0.03145	-7.87	0
lnfa	-0.02317	-13.09	0
lnfa^2	0.05606	11.88	0
y1	-0.11698	-8.02	0
y2	-0.10109	-9.75	0
y3	-0.09833	-9.69	0
y4	-0.04364	-4.62	0
y5	-0.05394	-6.06	0
y6	-0.03193	-3.81	0
y7	-0.02338	-2.91	0.004
y8	-0.04167	-5.31	0
y9	-0.0526	-6.8	0
y10	-0.02173	-2.85	0.004
_cons	2.532916	21.47	0

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