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Firm Characteristics as Determinants of Views on the Minimum Wage Policy

by

Gerardo P. Sicat*

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FIRM CHARACTERISTICS AS DETERMINANTS OF ATTITUDES

ON THE MINIMUM WAGE

by

Gerardo P. Sicat

Abstract

In this study, the opinions of operating enterprises regarding the minimum wage policy are studied with the use of ordered logit regression model. The study uses survey data that asked a series of questions dealing with labor market policies in the Philippines. The aim of this regression model is to estimate the probability that the respondent would choose one of the following ordered levels of answers to the question involving their opinion of the country's process of setting the minimum wage level: very poor, poor, fair, good, and excellent. The results of the regressions show that categorical groupings of the respondent firms determine the direction in which respondent firms choose their judgment of the labor policy issue. In particular, the nature of ownership, market orientation of the firm, age of the enterprise, employment size, among others, and even the specific position of the official of the company assigned to answer the survey play important influences on the formation of the firm's opinion on the policy. Such findings are likely to be important in framing reform issues on labor policies.

Subject areas: Labor economics, minimum wage, employment, labor market policies, labor regulation

FIRM CHARACTERISTICS AS DETERMINANTS OF VIEWS ON THE MINIMUM WAGE POLICY

by

Gerardo P. Sicat¹

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I. Introduction

Given an opinion survey in which respondents are asked what they think of a specific government policy, the respondent has several choices of replies to give. These answers are often put in terms of rising grades of approval. For instance, these answers are recorded as: disapprove strongly, disapprove, fair, approve, approve strongly. This questionnaire involves ordered choices in which the respondent is asked to give only one unique answer. Such opinion surveys are very commonly used. In the specific case of the survey from which data in this study, the survey asks the respondent to grade the policy as follows: "1" for *very poor*, "2" for *poor*, "3" for *fair* or *average*, "4" for *good*, and "5" for *excellent*.

The most common approach is to analyze these survey studies in terms of the frequency distribution of the responses. In a separate paper presenting the analysis of a survey of several inter-related labor market policies, this is the approach undertaken.² The objective of that paper was to understand the nature of the characteristics of the firms that had a critical opinion of the labor policies. For that analysis, it was illuminating to use the two-by-two tabular presentation: the specific respondent opinion about the policy was matched against a specific characteristic of the respondent firm. Going over several characteristics of the firm required each of the specific characteristics tabulated against the firm responses. Such analysis is very attractive for the popular understanding of complex opinion surveys. And they do not require any complicated technical tools of analysis.

A more satisfying method of analyzing these responses is to use econometric methods. This, however, confines the study among the specialists. However, useful results can be conveyed through other channels of information. In the technical study that follows, the method of logical choice is the ordered logit model and its cousin, the ordered probit model. This is briefly explained in the next section and more fully in the technical appendix. For the present, the motivation for the research study is given below.

In this study, the independent variable is the outcome – the response to a question on labor policy – that is made by a particular respondent firm (the probability that a particular answer is given) which is explained by a number of theoretically plausible variables or characteristics that are associated or possessed by the respondent firm in question. Any difference involving the difference in the occurrence of the event that cannot be explained by the characteristics associated with the respondent firm is an error, or residual, term that takes on a given statistical distribution.

² See G.P. Sicat, "Labor Policies and Philippine Companies: Analysis of Survey Opinions," University of the Philippines School of Economics, Discussion Paper 09-___, date, 2009.

The respondent firm's response depends on the economic concerns most related to its activities. In the absence of any direct indicators of such behavior, these interests could be represented by certain characteristics the firm possesses. There can be many aspects to these characteristics: whether the firm is a recipient or a non-recipient of fiscal incentives for its investments; who owns the company – domestic citizens or foreign investors or any unique combination of two; which sector of the economy the firm operates in; whether the firm sells mainly to the home or export markets; where the firm is geographically located; whether it is a small or a large firm by employment size; etc. Sometimes, too, some answers could predictably be the result of who among the officers of the respondents answers the survey questionnaire; etc.

Motivation of the study and data issues

More than statistical methods and their uses, this paper is concerned with understanding what determines the views that respondent firms express when posed a specific labor market policy. In the Philippine context, the issue of labor employment and poverty are twin topics of great importance because country's long term development performance highlights them as a great challenge yet to be conquered. Labor market policies constitute an important subset of the economic policies to be fixed if the country is to cure this poor performance.³ Hence, understanding the motivation of individual firms already situated in the country is a major step in asking relevant questions about what can be done to improve the labor policies already in place.

The labor market policies covered in the survey range over a number of issues. In any production operation, labor plays an important role in the output. Productivity of the employed labor is partly related to these labor policies. An aspect of this policy is to think that various labor market policies affecting the firm's operations are important to the firm's productivity. The labor policies include the following: the minimum wage; labor contracting; management-labor industrial relations; training of the work force; and workplace issues such as the number of holidays, sub-contracting, and outsourcing. The survey of companies was used in a more comprehensive study of employment issues in a project study financed by the Asian Development Bank. In such endeavors, the acquiescence of the government and the participants in the survey was important. These were cooperative efforts that made possible the survey that was administered in the early part of 2009.

The sample consisted of 157 operating enterprises located in Metro Manila and Cebu – the two most important commercial and industrial regions in the

³ Cite the labor study of the Philippine Congress. For a study of the critical issues of labor policies and their need for reforms, see GP Sicut and Imperial, comment.

country. The descriptive study of the responses already cited,⁴ covers fourteen different labor policy issues.

II. The econometric model: ordered logistic regression model

In response to a specific question about a particular labor market issue, the firm is given a unique choice from one of five possible answers that are arrayed in a rising degree of approval from one of disapproval. The respondent makes only one choice. Of course, the respondent could skip or ignore the question as an option.

The statistical model that is constructed in this case is different from the usual linear regression model. In such linear regression, a specific observation of the dependent variable is associated with observed values of the explanatory variables in the manner of linear functional relation. In the specific problem at hand, however, the dependent variable is the probability that the response is one of the five possible answers that describes the opinion of the respondent firms. The respondent's answer is conditioned by the various explanatory factors associated with the firm – its history, product or service of choice, and even the respondent's position in the firm. There are many such specific variables that could affect the answer.

The technical appendix explains the methodology behind the ordered logistic regression model which is the basis of the econometric methodology undertaken in this problem. The problem is to fit probability that each of the five possible answers to the labor market policy would be chosen by the sample of respondent companies that follows a logistic equation. The fitted logistic equation corresponds to the *cumulative distribution function* modeled after the distribution of the probability of the outcome of responses. Through the estimation of the logistic as a logarithmic likelihood function, it becomes a form of the linear regression model.

Using matrix notation, the problem of the ordered logistic model is to estimate a logistic equation in the form

$$y_i = \beta'x_i + u_i$$

where y and u are column vectors corresponding to the n respondents, respectively, of the responses (outcomes) and stochastic residual terms associated with the linear regression, x is the m by n matrix of respondents and their characteristics and β' the transpose of the column vector of m estimated coefficients. (The index i corresponds to the elements associated with the company respondent.)

⁴ See footnote 1.

Economic and data factors

The labor survey used in this study made it possible to define many characteristics that are associated with the respondent companies. It is easy enough to group companies by size of employment. Further, the questionnaire on the composition of employment of the firm produced useful categories of firms with different employee sizes. Respondent firms gave information on the percent of their workers who were technical and non-technical; professional, administrative and support; permanent and temporary; and so on. A new discrete variable was formed for these categories of workers: they are grouped in decennial steps – or steps of 10 percentage classes. Such a grouping produced a varied classification of the workers in the firm of different descriptions by skills or functions. As a result, percentage ratios of workers in a number of classes could be used as variables.

Ideally, data on revenue, capital, and labor for these firms would be helpful in the estimation of incomes and factor productivities. Such data could serve as starting points for asking testable economic propositions pertaining to the firm's economic operations. Such data that could be derived from the firm's balance sheets or income statements were not part of the data collection, in part because the survey was designed to bet labor employment data and to ferret out responses on issues that directly affected the firms. Securing data on the firm's operational activities could distract the quality of the data collection on the detailed labor data sought.⁵ Public economic data of that nature could only be secured at high cost and the results not altogether satisfactory as the surveys of manufactures demonstrate.

For the most part, this paper examines the respondent's answers to the minimum wage issue. This minimum wage issue has been long a settled policy as far as its structure and process is concerned. But periodically, when the level of the current minimum wage and the inflation rate situation get out of line with each other, the issue of determining whether a new level of the minimum wage adjustment would be needed almost always becomes a new and contentious issue to contend with.

Minimum wages are set by administrative regions of the country with the levels set in the National Capital Region as the guiding rate. However, it is an issue that is alive for as long as unemployment levels are high in the formal economy. Moreover, the process of setting the level of the minimum wage itself often appears in the public consciousness among all the specific labor market

⁵ Data collected in the government's surveys of manufactures do not give uniformly good information on fixed capital, revenues, and inventory change, for instance. Conceptual issues related to the collection of such surveys which are extensive in the country continue to pose problems for analysts.

policies. Economic developments that have an impact on the level of prices often trigger the demand for the review of the level of the minimum wage.

Hence the intensity of the policy issue is highly dependent on timing. The survey of companies was undertaken in the first quarter of 2009 when the world was gripped with the bad news of financial crisis in the international economy. Domestic news was bearish and full of uncertainty. The second half of 2008 however saw a dramatic rise of world energy prices that had triggered the drastic escalation of domestic fuel prices. These developments created agitations in the labor front. It created a sudden cost inflation that directly affected real incomes.

As the demand for minimum wage adjustments were being voiced, a contrary set of new developments took place. The financial crisis in America and the world economic recession that followed changed the main economic scenario across many countries. The wage agitation became a benign rather than provocative factor. For energy prices plummeted from \$140 per barrel to below \$40 per barrel of crude. And this signaled a fall in world demand for goods causing a world recession. On the domestic front, the fear of inflation was transformed into a fear of potential job losses and income declines. Thus, there became less for minimum wage adjustment.

By the time of the survey, this climate of fear about the future might have been highest. It is possible that answers to the labor policy issues could have been influenced by these developments. However, it would be difficult to argue whether they had enhanced its relevance or made the respondents simply more agitated about the issue.

Hypothesis: Track the characteristics that help to explain respondent answers

A major hypothesis that is tested is that the composition of the labor force plays an important role in the opinions of respondent firms to the labor market policy, in this case, the minimum wage. This composition is expressed in terms of any of the ratios of specific types of labor to total employment. In addition to this, other types of important characteristics of the firm are used. Such characteristics could only serve as proxy variables for other more specific variables if only they could be measured more directly.

Table 1 presents the variables used in the study. The first column shows the symbols used for the variables used. The second column interprets these symbols in terms of the meanings attached to them in this paper. The third column provides a disaggregation of the classifications of the respondent firms used further in the regressions. Another aspect of the third column is to provide the specific labor market question that was asked of the respondent firms. In each of these labor market variables, the answers are any one of five choices that the respondent had to mark: *very poor, poor, ..., excellent*, as already discussed.

The ordered logistic regression model attempts to explain the probability that particular opinions of a sample of firms can be explained by a set of respondent characteristics. The regression model is extended to one that uses additional interaction variables that are associated with the group characteristics that are defined for the purpose. Such group characteristics are specified in the third column explanations of Table 1. This additional feature of the regression is sometimes referred to as a hierarchical linear model,⁶ which makes use of the ordered layering of groupings associated with certain features of the explanatory variables, in this case, that of differences in the classifications of the respondent firms.

The firms in the sample survey represent different economic interests that could be identified by characterizations of their particular groupings, for instance, their own markets, the ownership interests that are involved, and the individual histories of these operating enterprises in the economy. It is expected that such characteristics could help in defining their attitudes in relation to any specific labor market policies that affect them directly in their own operations.

The regression estimates that invoke these characteristics would certainly make easier the identification of information about the probability that certain responses conform with the distribution of responses to the various questions posed pertaining the labor market policies which in this case is the firm's judgment about the minimum wage setting.

As a final exercise, post-estimation of the various probabilities of responses based on the logistic regression is made. Such estimates of these probabilities yield the probability assessments resulting from the logistic fit of the regression equation.

⁶ See Greene (2008), pp 233-8. Sometimes these models are known as mixed models, random parameter models.

Table 1. Variables used in the study explained

Variable in order of appearance	Variable meaning	Sub-group identifiers/ Q in case of LP_*
LP_min_w	Labor market policy on minimum wage setting	
grp_t_r	Ratio of technical employees to total workers	
grp_nt_r	Ratio of non-technical employees to total workers	
grp_prf_r	Ratio of professional staff to total workers	
grp_ad_r	Ratio of administrative staff to total workers	
grp_prm_r	Ratio of permanent employees to total workers	
Owner	Identifier variable for owners of the enterprise	"1" = 100% Filipino-owned "2" = 60% Filipino-owned "3" = 60% foreign-owned "4" = 100% foreign-owned
inv_inc	Investment incentive recipient (BOI, PEZA or other)	"1" = Yes, recipient "2" = No, non-recipient
co_age	Company age in years	"1" = up to 5 years old "2" = 6 years up to 10 years old "3" = 11 years up to 20 years old "4" = more than 20 years old
co_employmt	Company size in terms of number of workers	"1" = up to 9 workers - micro "2" = 10 to 99 workers - small "3" = 100 to 199 workers -medium "4" = 200 workers and above - large
Hro	Respondent official who filled the questionnaire	"1" = respondent is the Human Resources official "2" = respondent is a manager below CEO or owner "3" = respondent is president, CEO, or owner
Reg	Region where the enterprise is located	"1" = Metro Manila region "2" = Southern Luzon region- Calabarzon "3" = Metro Cebu region
LP_sec_c	Labor policy on the payment of severance costs	
LP_fxtc	Labor policy on restrictions on fixed term contracts of employment	
LP_dismissal	Labor policy on restrictions on dismissal of workers	
LP_l_disputes	Labor policy on the processes involving settlement of labor disputes	
LP_industrial relations	Labor policy covering industrial relations within the firm	
LP_holidys	Labor policy dealing with holiday matters – pay, additional public and local holidays	
LP_ovtime	Labor policy on the payment of overtime	

III. Regression outcomes and discussion

A typical result of the ordered logit regression model is given in Table 2. In this model, the ratio of technical workers to the total workers of the firm is used as the independent variable. The statistical result is disappointingly poor on that score alone. Even if this is not statistically significant however, there are other variables that are used as important characteristics on which the firm's opinions could depend. In this model, which is referred to as Model_1 among the regression equations calculated, there are many other variables that could describe all the firms covered in the survey. As discussed earlier, the categorical groupings are used as additional interaction variables to implement the hierarchical linear extension of the regression model. This enabled the estimation of coefficients of the model that are related to the specific categorical variables that described particular respondent firms in the survey.

After experimenting with as many categorical variables, a few of them stood out. This pertained to categorical variables on who owns the firm; whether the firm has received fiscal incentives or not; the particular age of the particular respondent firm; the size of the labor force of the firm (whether micro small, medium, or large); including even who among several classes of officials of the firm had filled up the questionnaire.

The resulting estimates are enlightening. New information about the statistical impact of the categorical variables can be stated with statistical confidence. The interaction variables are essentially dummy variables to account for the specific characteristics of the respondent in terms of a particular grouping.

The regression program *Stata* treats the first grouping within a particular variable as the base variable for comparison. Once a particular categorical variable is invoked in the regression as an explanatory variable, the first of the categories is used as the base group which is incorporated in the whole regression estimate. The interaction variables for the other sub-groups yield coefficient estimates that help in the influencing the opinions expressed about the labor market policy issue on hand. A significant positive estimate for the specific category indicates that the contribution of that category is to raise the probability level of the reply being made. On the other hand, a negative estimate for the same category which is statistically significant reduces the influence on the corresponding probability of an answer being larger. An estimate that is not significant statistically implies that that particular category has no influence on the probability of occurrence being any different than what it would be if it were not entered as a determining variable.

In this way, the regression estimates associated with the interaction variables incorporate the full influence of the respondent firms having that

particular set of characteristics. The estimated coefficients associated with a particular sub-group of characteristics are either more or less than the numerical influence of their base group on the overall regression equation.

**Table 2. Ordered Logistic Regression Results:
Minimum Wage Responses as Dependent Variable**

Ordered logistic regression		Number of obs = 137				
Log likelihood = -181.41874		Likelihood Ratio Chi-Sq(19) = 30.27				
		Prob > chi2 = 0.0485				
		Pseudo R2 = 0.0770				
LP_min_w	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
grp_t_r	.0014966	.0061887	0.24	0.809	-.0106329	.0136261
_lowner_2	-.1259219	.5238389	-0.24	0.810	-1.152627	.9007835
_lowner_3	-1.501681	.8980531	-1.67	0.094	-3.261833	.2584705
_lowner_4	1.444741	.5796994	2.49	0.013	.3085512	2.580931
_linv_inc_2	-.2627906	.3692373	-0.71	0.477	-.9864823	.4609011
_lco_age_2	1.337414	.5986518	2.23	0.025	.1640781	2.51075
_lco_age_3	1.356795	.6213328	2.18	0.029	.1390049	2.574585
_lco_age_4	.74293	.6370387	1.17	0.244	-.5056428	1.991503
_lco_employ~2	-1.755171	.7809625	-2.25	0.025	-3.285829	-.2245125
_lco_employ~3	-1.876332	.8279604	-2.27	0.023	-3.499104	-.2535591
_lco_employ~4	-1.712759	.8313876	-2.06	0.039	-3.342249	-.0832691
_lhro_2	-.1493081	.4469003	-0.33	0.738	-1.025217	.7266005
_lhro_3	-1.971664	1.083392	-1.82	0.069	-4.095075	.1517458
_lreg_2	-.8347728	.4923817	-1.70	0.090	-1.799823	.1302776
_lreg_3	.6716422	.4031189	1.67	0.096	-.1184563	1.461741
_lexp_2	-.392255	1.164411	-0.34	0.736	-2.674458	1.889948
_lexp_30	.2589429	.6078202	0.43	0.670	-.9323628	1.450249
_lexp_70	-.6875333	1.107214	-0.62	0.535	-2.857634	1.482567
_lexp_100	-1.194279	.576316	-2.07	0.038	-2.323838	-.0647205
constants						
/cut1	-3.611035	.9801158			-5.532026	-1.690043
/cut2	-2.382761	.9472454			-4.239327	-.5261937
/cut3	-.2499738	.9307536			-2.074217	1.57427
/cut4	1.311872	.9361823			-.5230117	3.146756

At the bottom of the table of results after the reports on coefficient estimates is a section of the estimates of constants that are labeled as cuts, in particular, "/cut 1," ..., "/cut 4." These are points within the logistic equation that correspond to the estimates of the constants a_1, \dots, a_4 (see Technical Appendix). These cuts or measures along the x -axis represent probabilities corresponding to the point of the log-likelihood function which is in the form of a statistical *density* function).⁷

The impact of the interaction variables representing firm characteristics can now be evaluated. It is interesting that the standard errors of all the interaction variables are for the most part smaller than the value of the

⁷ It is to be noted that $a_5 = 1 - \sum a_i$ ***

estimated coefficient. The corresponding z-statistic (*Stata* gives the z- statistic – the fraction of the standard error to the group mean – rather than the t-statistic for such regressions) is close to 2.0 and above 1.5, meaning that given most of the estimates are significant at between 5 percent and 10 percent. The probability that the coefficient estimates are different from zero would be statistically acceptable outcomes although they are not excellent statistical fits. However, these findings have much in common with the problem of the goodness of fits of many econometric studies based on the logistic model.⁸

Owners of the firm

The base information in the regression equation is that of the 100 percent Filipino owned enterprise. The coefficient for *Owner_2*, or enterprises controlled by Filipino nationals, is not statistically significant. Thus it can be assumed that it is much like the 100 percent Filipino owned. The foreign-enterprise controlled enterprises (*Owner_3*) have a negative coefficient estimate. This means that its impact on the opinion level is to bring it down to a lower level of approval. What is interesting here is that the 100 percent foreign owned enterprise (*Owner_4*) has a fairly high positive coefficient implying that its opinion of minimum wage legislation is more favorable than the typical Filipino owned enterprise response.

This is an interesting finding. Much of the disapproval rating of minimum wage policy arises from the responses of domestic firms owned by nationals and to some those that are partly owned by foreigners. But the fully owned foreign enterprise is not bothered by the level of the wage rate nor the process of altering it. At least, the minimum wage may not be the main cause of their complaint if there is any on the wage issue. Moreover, since the number of respondent firms are mainly Filipino-owned firms and there are quite a number of these firms that also favorably responded about minimum wage, their net effect, together with those favorable replies of foreign-owned companies, is to swamp the unfavorable responses of the Filipino-owned firms that complained about the minimum wage policy.

A usual observation about establishments in the country is that many workers prefer work in foreign owned establishments. In part, the pay scales of the lowest paid workers are often above the minimum wage. Such evidence is clearly in tune with the finding that the coefficient associated with the fully owned foreign enterprise indicates that such firms add to the base scores that the Filipino enterprises have in respect to the minimum wage issue.

Investment incentives: BOI or PEZA perks

Recipients of fiscal incentives (*Inv_inc_1*) for the promotion of investments from the government represent the base information in the regression equation. A priori, their costs are reduced by the amount of incentives received. So the

⁸ For instance, see Greene, ch. 23 (?) look for specific quote... on goodness of fit issues.

wage costs associated with minimum wage would be partly eased by the fiscal incentives. In the case of the non-recipient of fiscal incentives, the a priori expectation would be that they would tend to reduce the value of the coefficient associated these enterprises. The reason for this is simply that wage costs are likely to be a stronger factor to them than those receiving fiscal incentives.

The interaction variable of the non-recipients of fiscal incentives (*Inv_inc_2*) is not statistically significant. The estimated coefficient nevertheless appears to veer toward the expected negative sign of that coefficient were it significant. That would have implied that non-recipients of fiscal incentives would tend to be less favorable toward the minimum wage issue. But no matter, the estimated coefficient is not different from zero because it is not significant.

This finding is not surprising. Fiscal incentives are often targeted at major aspects of an investment operation – freeing from some types of taxes, from the reduction in the cost of investment in capital goods through a reduction of interest cost, and other kinds of cost reducing activities mainly aimed at the acquisition of raw materials and of capital goods but often not associated with wage costs.

Age of the firm: young vs. older enterprises

Firms that are as young as 5 years (*Co_age_1*) are the base information in the regression equation for this interaction variable. The older the firm, the more likely that it has gotten more familiar with the status quo. Therefore, the older firm would likely be more favorable to the labor market issue than the younger one, or at least such an attitude would be reflected in the value of the coefficient that has been estimated. This would imply that the coefficient would be positive – that is, its influence would add to the level of satisfaction for the policy. In short, the coefficient estimate would add to the mean score associated with the particular group of enterprises.

The coefficients estimated for the age of the enterprise are all positive. The degrees of errors associated with the estimates are all less than the value of the coefficient estimates. The older firms have a higher level of tolerance and acceptance for the issue of minimum wage than the younger firms.

These findings are easy to understand. In the long run firms adjust better to the environment in which they find themselves. Those firms that continue to find problems with existing policies often find other means of adjustment to internalize the associated costs that they bear from these policies. Those that have learned to accept them early as useful and important policies do not get bothered by their continuous reappearance in the scene and accept them as part of the business environment.

Market orientation of the firm: Home vs Export

The market that is served by the firm is important in determining the type of competition the firm faces. Most of the firms in the sample involved domestic companies in the various trades including distribution and manufacturing. The variable *exp* grouped the companies by the extent to which they sold their products to the export market. The preponderance of the sample consisted of fully domestic market oriented firms, those with zero exports.

Fully domestic market based firms (*Exp_0*) form the base information for the regression. Firms that have partial export orientation – whether below half of market or substantially export oriented – do not have statistically significant estimates. But the information conveyed by the estimate for the 100 percent export firm conveys an important message. The estimate is negative, meaning that these firms view minimum wage policy with more suspicion than the typical domestic firm which has a higher tolerance for the wage policy. (The negative coefficient associated with the fully export oriented firm is a value that can be deducted from the contribution of the base firm – the fully domestic market selling firm – to the overall regression constant.)

This finding needs to be reconciled with the other finding already reported that fully foreign owned companies do not seem to be as fazed by minimum wage policy as are companies owned by nationals. In fact, those foreign investments that come to the country see the wage rates to be attractive for their operations. The fact is that many of the fully export-oriented firms with a critical view of minimum wage policy are domestically owned export firms. These are often small scale export operations.

This is an important point that stakeholders who keep on proposing higher minimum wages seem to miss. The major adverse impact of minimum wage policy (when they are raised to levels that hurt businesses) is felt mainly by domestic enterprises, especially those that have foreign markets as their target. They experience loss of competitiveness when the minimum wage levels are brought to levels that threaten their operational viability. For many foreign investors in place in the country, oftentimes, the minimum wage adjustments appear reasonable or not threatening.

This point cannot be lost to policy makers. Foreign investors in the country often have greater flexibility in dealing with their operational costs, including labor costs. They have greater ability to make adjustments in their capital per worker investment. If labor costs rise, they could invest in labor-saving equipment more quickly. At worst, they have the option of exit from the country and move to another low cost country. They can therefore survive more easily since labor costs could be kept minimal in their operations.

But the domestic export firm has no escape from higher labor costs, or at least they would be more constrained by their own resource position to adjust as

well as the foreign owned enterprise. They do not have the resources that make exit from the country possible in order to relocate to lower wage countries.

It is important also to make the point about surveys that should not be lost. Only domestically operating enterprises whether owned by nationals or by foreigners form the population from which survey samples are selected. To some extent, frequency distribution of the replies of to the question is highly influenced by the selected samples from the population of operating firms. If an investment promotion program fails to attract sufficient amounts of foreign investors into the country, there would be fewer types of desired foreign investors within the sample population of the survey.

Employment size of the firm

The smallest firm size – the micro unit (*Co_employt_1*) is the base information for the regression. As the firm increases in size, the payroll rises. All other things equal, the higher payroll size would likely be more concerned with the rising wage costs. But this is premised on the level at which the minimum wage is set. Firms with higher budget constraints and those with other markets to face appear to be more disposed to favor the minimum wage issue because its overall implications on their costs tend to be not a factor.

A priori reasoning means that larger size of employment means higher wage costs, all other things remaining unchanged. Thus larger firms would have larger coefficients than smaller ones, much more in the case of the base case of micro firms. This is in fact what is found. All the regression coefficients for small, medium and large scale firms in the sample are larger than the base case. The estimates are all different from zero at the statistical level of significance ranging 6 to 9 percent.

If larger wage costs affect the opinion of operating enterprises in the economy, then these results fully support the view that respondent firms would be predisposed to give a more critical view of the minimum wage issue. There are other developments that could help negate such a factor arising from wage cost for which there is no direct evidence. This is seen in part in the finding that fully owned foreign direct investment enterprises – some of these are essentially medium and large scale investments in the country – are effectively able to counter this by their predisposed favorable response for the minimum wage issue. This attitude would likely be supported by higher productivity of labor in these enterprises (so that labor at least more than compensates for higher level of minimum wages) and by the availability of more capital per worker, one of the factors that propels higher productivity. However, lack of direct data on productivity or capital per worker associated with each respondent (an

important point stressed earlier⁹) prevents any direct statement on that account. Of course, production theory clearly supports this reasoning.

Regional location of the firm: Metro Manila vs. Metro Cebu

The regional interaction variable has Metro Manila firms is (*Reg_1*) as constituting the base information of the firms included in the regression. Southern Luzon firms in Calabarzon (*Reg_2*) and Metro Cebu (*Reg_3*) firms constitute the other operating firms in the sample.

The minimum wage has Metro Manila wages as the reference point for the regional wage setting: they are the highest levels. All other regions set their wage level as a fraction of the Manila levels. Calabarzon firms are almost like those in Manila and there is hardly much difference from Manila levels. Metro Cebu is the second most populous and most developed metropolitan city in the country. It is home to a lot of export oriented enterprises and medium scale industries aside from being the country's main trade entrepot. The minimum wage level of Metro Cebu is ___ of the Metro Manila rate.

Given this institutional difference among the regions in regard to the issue at hand, it would seem that there is a priori reason for the opinions of firms in all locations to be partially equalized or neutralized in regard to the minimum wage. In fact, the coefficient estimate for Calabarzon is not significant. One could then assume the firms tend to have the same views on the matter as in the base case. Metro Cebu firms tend to be more tolerant about the minimum wage issue. The coefficient estimate is higher than the base case since it is positive although the statistical significance is only different from zero at a low level of statistical significance at 15 percent.

Who filled up the respondent's questionnaire?

As the various initial regressions were being calculated and the outcomes evaluated, it became apparent that perhaps the official who filled up the survey questionnaire could contribute to the trend of the answers. Is there perhaps an answer that is based on the respondent's position in the firm? Hence, the issue of importance is to ask whether there could be a mandate bias. There was therefore some value in asking whether the answer was in part due to the officials to whom was given the task of answering the survey questionnaire.¹⁰ Re-examining the data records only to find the position of the official who responded to the survey questionnaire and his position (but

⁹ See comments above, p. ___.

¹⁰ This point is helpful in making some extended remarks about the waste of statistical resources when documentations are hidden from view and on the pretext of confidentiality legitimate researchers are not able to undertake fuller statistical and social science analysis of the surveys for which statistical gathering are often made. An example below is cited: cite here the amount of money spent on the survey of skills etc.... [make a short essay of this point....]

respecting the full confidentiality covenant of the survey), each respondent was identified by the official who handled the questionnaire.

Three major officials were typically given charge of the task. The job was typically given to the human resources director or senior officer in that department. Most of the replies were made by these officers. In some cases, someone with a responsibility in management replied to the questionnaire. And in a few cases, it was the president, CEO, or general manager who answered the questionnaire. It can be surmised that even though a particular firm develops its own approaches to specific circumstances and policy issues by virtue of company history and culture, there could be a substantial difference in the points of view among human resources officers (who administer the labor welfare standards of the employees), managers (whose main task is to deliver the firm's specific yearly objectives), and owners and CEOs (who are most concerned with firm profits, survival, and other major objectives).

The interaction variable *hro* means human resources officer. The basic information conveyed by the human resources manager (*Hro_1*) is represented as the base data used in the regression. The answers that were provided by lower level manager (*Hro_2*) and those by the owner, CEO, or president (*Hro_3*) would differ from those of the base case answer. In particular, there could be a *mandate bias* for the *hro* who would likely have a coefficient estimate that is higher than that associated with either of the two *hro* interaction variables.

In fact, this conjecture is highly vindicated. The regression coefficients for the two other interaction variables had different coefficient estimates from those of human resources officers. The coefficient associated with owners, CEOs or heads of the enterprises (*Hro_3*) is negative, as they are most expected to be concerned with minimizing costs. In short, owners of the enterprises would tend to be less sympathetic with the cost implications of minimum wage policy while human resources officers would be more favorable. The coefficient for other managers below president (*Hro_2*) has also a negative sign, but this is not different from zero statistically. Hence, their opinions are no different from those of the human resources officers.

Summarizing this part of the interaction variables pertaining to the officials who answered the questionnaire, it is found that there is a difference of opinion between human resources officers and owners of the enterprise. Sub-managers who have more general management positions in the firm do not differ much from the views that the human resources officers would express. But the highest officials of the firms who would be most concerned with economic survival of the firm in the economic environment would take a more critical view of minimum wage issues when they arise.¹¹

¹¹ This does not mean that they would not be favorable to the issue of adjusting the level of the minimum wage. It only means that owners would view such a decision against other issues more

Goodness of fit

Commentary on goodness of fit of the model has been confined to the discussion of statistical properties of the coefficient estimates, their standard errors, their corresponding z-statistic equivalents and the statistical tests that the respective coefficients are different from zero. In this type of discussion, the statistical tests lead to probability limits that do not inspire high confidence. However, in a lot of work on logistic regressions, there appears to be greater level of tolerance for lower confidence levels. While in standard regressions linear regression models, the 5 percent level of probability is often used as a limiting test for the test of confidence, somehow the logistic model has allowed weaker estimates. In the discussion above, many of the interaction variables associated with grouped data, levels of confidence between 10 to 5 percent probability levels have been accepted.

As far as the overall logistic equation fit is concerned, the goodness of fit relies on the convergence of the log-likelihood function, on the overall fit of the equation using the *chi-square* test, and on some indications based on the *Pseudo-R²* statistic.

The log-likelihood of the logistic equation converges after four or five iterations. That assures that the maximum likelihood estimate of the logistic regression has been attained. The chi-square test of the equation yields the information that the derived regression is significant at the 5 percent probability level.

The *Pseudo-R²* statistic is very low. This statistic is calculated in *Stata* but it has of late received a controversial review. The statistic is supposed to proxy the well known *R²* statistic which explains how much of the variations in the equation is explained by the variables used in the equation. Under this hypothesis, practically nothing would be explained by the *Pseudo-R²* statistic. Green (2008) for instance does not support it as a useful statistic.

The ultimate test of goodness of fit in this case could be whether the probability predictions of the model for each of the answers made by the respondents track carefully the frequency distributions of the survey responses. This is now the subject of the present investigation.

critically. In particular they would be more concerned whether the adjustment in minimum wage issues would adversely affect their survival as an enterprise. On the other hand, it is clear that the human resources officers has the clear mandate of assessing the impact of the labor issue on the welfare of workers in the firm.

Table 3. Dependent Variable: Responses to Minimum Wage Issue, with Five Ordered Logit Regression Models

Variable	Model_1	Model_2	Model_3	Model_4	Model_5
grp_t_r	.001497 .00619 .809				
grp_nt_r		.005266 .00672 .433			
grp_prm_r			-.001216 .00551 .825		
grp_prf_r				.005183 .01213	
grp_ad_r			.669		.028581 .0127 .0244
_lowner_2	-.12592 .5238 .81	.43546 .5783 .451	.047283 .5026 .925	.062721 .5062 .901	.18266 .5127 .722
_lowner_3	-1.5017 .8981 .0945	-.89984 .8776 .305	-1.2746 .8507 .134	-1.2943 .8455 .126	-.94355 .8636 .275
_lowner_4	1.4447 .5797 .0127	1.6666 .5831 .0043	1.5238 .5386 .0047	1.4174 .558 .0111	1.2397 .6174 .0447
_linv_inc_2	-.26279 .3692 .477				
_lco_age_2	1.3374 .5987 .0255	.32528 .6218 .601	.45955 .5465 .4	.4833 .5494 .379	.77381 .6182 .211
_lco_age_3	1.3568 .6213 .029	.99433 .6294 .114	.7675 .5716 .179	.71794 .565 .204	1.1708 .6388 .0668
_lco_age_4	.74293 .637 .244	.20423 .6701 .761	.24172 .601 .688	.2491 .5911 .673	.27921 .6749 .679
_lco_employ~2	-1.7552 .781 .0246	-.024212 .8164 .976	-.97178 .6167 .115	-.89776 .6276 .153	-.27614 .7135 .699
_lco_employ~3	-1.8763 .828 .0234	-.009721 .8825 .991	-1.1984 .6807 .0783	-1.0941 .699 .118	-.44563 .7947 .575
_lco_employ~4	-1.7128 .8314 .0394	.055459 .8792 .95	-.93176 .6979 .182	-.84642 .6924 .222	-.060059 .7944 .94
_lhro_2	-.14931 .4469 .738	-.53637 .4878 .272	-.49103 .4151 .237	-.44773 .4198 .286	-.49214 .4448 .268
_lhro_3	-1.9717 1.083 .0688	-1.3388 1.061 .207	-1.5471 .8847 .0804	-1.4672 .8684 .0911	-1.2361 .9018 .17
_lreg_2	-.83477 .4924 .09	-.31806 .5614 .571	-.67366 .4562 .14	-.58398 .4687 .213	-.69486 .5522 .208

_lreg_3	.67164	.81799	.61693	.65852	.79884
	.4031	.4254	.3672	.3746	.3963
	.0957	.0545	.093	.0788	.0438
_lexp_2	-.39225	1.1075	-.41659	-.52801	.49442
	1.164	1.206	1.103	1.112	1.165
	.736	.358	.706	.635	.671
_lexp_30	.25894	-.14245	-.22715	-.14228	.014995
	.6078	.6158	.5968	.5898	.6158
	.67	.817	.703	.809	.981
_lexp_70	-.68753	-1.7906	-.81949	-.80389	-1.9124
	1.107	1.283	1.046	1.038	1.278
	.535	.163	.433	.439	.134
_lexp_100	-1.1943	-1.4971	-.98412	-.94917	-1.0661
	.5763	.6397	.5614	.5554	.5745
	.0382	.0193	.0796	.0875	.0635

cut1					
_cons	-3.611	-1.9444	-3.3553	-3.091	-2.0823
	.9801	1.028	.898	.8472	.8842
	2.3e-04	.0586	1.9e-04	2.6e-04	.0185

cut2					
_cons	-2.3828	-.79527	-2.2383	-1.9729	-.93797
	.9472	1.009	.8712	.8219	.8571
	.0119	.431	.0102	.0164	.274

cut3					
_cons	-.24997	1.564	-.16114	.1033	1.3255
	.9308	1.019	.8562	.8095	.8553
	.788	.125	.851	.898	.121

cut4					
_cons	1.3119	2.8459	1.1028	1.3741	2.686
	.9362	1.035	.8594	.8128	.877
	.161	.006	.199	.0909	.0022

Statistics					
Pseudo-R-sq	.076995	.069952	.055474	.050763	.071189
Chi-sq	30.267	25.078	24.846	22.553	27.457
Deg.of freedom_m	19	18	18	18	18
No. of Obs.	137	128	155	154	136
Log-likelihood	-181.42	-166.71	-211.52	-210.87	-179.11

legend: b coefficient /standard error /probability

Other logistic equations based on other labor force compositions of the surveyed firms

Table 3 shows the results of other calculations based on the ordered logit regression. The results analyzed above – called Model_1 – are included in this table, together with four other models – Model_2 to Model_5. This table illustrates the effects of using as explanatory variables different labor structures of the respondent companies using the ordered logit regression model except for the different labor definitions. Model_2 uses the percent ratio of non-technical workers in the firm; Model_3 the percent of permanent or regular employees (in contrast to those who are contractual); Model_4 the percent ratio of

professionals employed; and Model_5 the percent ratios of administrative workers.

In each of these regressions, the interaction of particular categorical variables is used as additional explanatory variables. When the categorical variables are not statistically significant, they are removed from the regression. Once a particular category or characteristic is included and a particular sub-category becomes statistically useful, the set of sub-categories are derived. The table shows first the coefficients of the regression, the corresponding standard errors, and then the implied probability significance based on these error terms.

The explanatory variables that are connected with labor composition are not significant. This is true for the different types of labor – whether technical or non-technical, professional or administrative, and permanent or temporary. The composition of the labor force of the firm is not an important factor in explaining forming the prevailing opinion of the company regarding the minimum wage issue. However, the various interaction variables based on specific characteristics into which the respondent firms are grouped are important in bringing nuance to the answers that they finally form in regard to the minimum wage issue.

Finally, a recalculation of Model_1 is done utilizing the ordered probit regression model. As is well-known the results of both models logit and probit models are close. The probit model fits, as indicated in the technical appendix, is based on the normal distribution of the error terms in contrast with the logistic of the logit model. The results of the ordered probit Model_1 are reported in Table 1A in Appendix 2.

Probability predictions from the ordered logistic regression

The overall goodness of fit of the ordered regression model could be assessed further from the predictions that could be made from it. The estimated parameters from the model produced predictions of the various probabilities of answers for the minimum wage issue from the sample of operating enterprises. The predictions of the probabilities track very well the frequency distributions of the answers of the enterprises in the labor market survey.

Table 4 shows the distribution of the five different probabilities of answers derived from the estimated logistic equation. The probabilities are shown in Part A of the table according to the five different answers: "very poor", "poor", "average", "good", and "excellent". The probability estimate that gives the highest level of error arises from those firms that give an answer of "very poor" assessment of minimum wage policy. To this group, 7.6 percent of respondents belong. The standard error term is just above the value of the mean probability, indicating a relatively poor fit for this probability. The only other probability that has a shaky estimate is the extreme answer among the "excellent", but this is so much better because the standard error is somewhat smaller than the mean.

These are the extreme observations in both cases that somehow convey the discomfort that these firms feel with respect to the minimum wage issue. This is to be expected as the most controversial aspects of the minimum wage are their impact on some groups of operating enterprises.

Table 4. Predictions of Probability (based on Ordered Logit Model_4) Vs. Frequency Distribution of Responses to Minimum Wage Issue

A. Predicted Probabilities

Variable Outcome	Obs.	Mean	Std. Dev.	Min	Max
Very Poor	137	.076739	.0772983	.002805	.4734356
Poor	137	.1224423	.070495	.0067106	.297767
Average	137	.4085064	.0857918	.0654727	.4877804
Good	137	.2521472	.0901334	.0291286	.3716863
Excellent	137	.1401651	.106877	.0080297	.7212416

B. Actual Frequency Distribution and Cumulative Distribution of Responses

Minimum Wage Issue	Freq.	Percent	Cum.
Very Poor (1)	12	7.64	7.64
Poor (2)	18	11.46	19.11
Average (3)	67	42.68	61.78
Good (4)	34	21.66	83.44
Excellent (5)	26	16.56	100.00
Total	157	100.00	

Part B of Table 4 shows that actual frequency distribution of the responses to the minimum wage question. In general, the estimated probabilities that are reported in Part A are very close to the actual frequency (expressed in percent of total respondents), of the answers made by the respondent companies in Part B. The sum of the probabilities if added together in Part A sum up (close to) 1 in the same manner that the cumulative frequency in Part B add up to 100.

IV. Supplementary discussion: other responses as explanatory variables

What would happen to the ordered logistic regressions if the responses to the issue of minimum wage were to depend on the responses that the same respondents gave to other labor market issues that were also the subject of survey study? Recall that the responses to the labor market issues, those on the minimum wage included, do not correspond to real values that are associated with customary variables but represent an ordinal ranking of answers. On that score, each answer is not a direct observation of a value or specific quantity but a probability of particular choice from a ranking of several responses layered

sequences.¹² Of course, what the respondent chooses represents a judgment about approval or disapproval of the policy.

To use the responses to the other labor policy issues as determinants of the minimum wage issue requires a leap of faith: for that means that the ordinal rankings are treated as if they are direct indicators of value. An obvious difficulty of this assumption is that the values associated with the ordinal indicators are ranks and are not actual numerical values. Moreover, the changes from one level to another of higher level of approval are uniform (for instance, from 1 to 2, 2 to 3, etc.).

Despite these limitations, these numbered indicators provide a rough guide to whether the various judgments agree with one another or not. For this reason, the next step would be to measure their correlations among each other. Two by two tables of responses would be one quick way of viewing these potential associations. Another method is simply to calculate the simple correlations among pairs of responses to labor market issues. These methods were both used in a separate paper.¹³ All these steps are a forward move toward finding the links of other views regarding labor market policies among the operating firms in the country.

Table 5. Partial Correlations of Responses the Minimum Wage Issue with Other Labor Market Issues (observations=157)

Variable	Partial Corr.	Significance
LP_sev_c	0.3146	0.000
LP_fxtc	0.1969	0.018
LP_dismiss	-0.0020	0.981
LP_hours	-0.0583	0.486
LP_overtime	0.1146	0.170
LP_ind_rel	0.0726	0.385
LP_l_dispu~s	0.1225	0.142
LP_l_inspct	0.0994	0.234
LP_p_of	-0.0183	0.827
LP_l_train	-0.0049	0.953
LP_v_sch	0.1070	0.200
LP_hol_dy	0.0958	0.252
LP_ohol_dy	-0.0418	0.618

Table 5 represents yet another but improved approach to the issue through estimates of the partial correlations coefficients of each of the other

¹² An alternative analysis for this problem could use simple linear regression or alternatively rank correlation. These models would yield different outcomes in that values of the responses would be associated with values of the dependent variables and the model shifts away from the probabilistic implications of the response model as introduced in the logit or probit models. It is for this reason that the logit model is utilized.

¹³ These calculations together with corresponding analysis of their messages are analyzed in Sicat (2009).

labor market policies with the responses of the firms to the minimum wage issue. Such partial correlations are derived from undertaking a multiple regression of all the relevant independent variables (the responses to labor market issues deemed related) with the minimum wage responses. That regression generates partial regression coefficients that help to explain the minimum wage responses associated with specific variables but holding the influences of other variables constant. The partial correlation coefficient estimates, shown in Table 5, provide a measure of the correlation of the specific labor policy issue with the minimum wage, holding the effects of all the labor policy issues unchanged. For this reason, the partial correlations are different measures from simple correlations.

Positive partial correlations among the responses are expected because of the rising nature of the order of responses. Negative correlations are possible when one set of labor policies tended to provide contradictory orderings among the firms for the answers to the question. These negative correlations are very low and not statistically significant, implying that most of the ordering of the answers to the questions followed the same pattern of rise in the indicator values.

The approach that is most akin to the thrust of this study is to apply the ordered logit equations in which the main explanatory variables used are the answers to some of the labor market issues appear to have significant correlations, as already seen from Table 5. In this way, the major labor market policies that figure most prominently in the discussion of critical aspects of labor policy are explored as explanatory variables.

Table 6 reports the estimates of ordered logit regressions—in the manner of the presentations of Table 3 – adopting the responses to other labor market policy issues as explanatory variables. In this table, three different models – called Model_6, Model_7, and Model_8 – are used to explore this hypothesis. What is clear from this set of regressions is the good fit of the coefficient estimates involving the different answers to the questions of the labor policies regarding the payment of severance costs, the restrictions to fixed term contracts, and the policy on the settlement of labor disputes. The labor policy making the dismissal of workers difficult is not significant. (Such is already the message that is derived from Table 5). But on the matter of the number of public holidays the estimated coefficient is significant (Model_8).

These major labor market policies received generally varied responses in the survey. Offering them as explanatory variables provides a key toward explaining how they help to impact on the enterprise response the minimum wage issue.¹⁴ To each of these labor policy issues, some critical commentary often is more prevalent, but this depended very much on the particular labor issue that is taken into account.

¹⁴ See GPSicut (2009) on the survey responses.

Table 6. Ordered Logit Regressions Using Responses to Other Labor Market Policies as Explanatory Variables: Model_6, Model_7 and Model_8

Dependent Variable: LP_min_w

Variable	Model_6	Model_7	Model_8
LP_sev_c	.75114 .1727 1.4e-05	.77435 .1635 2.2e-06	.73476 .1585 3.6e-06
LP_fxtc	.49465 .1432 5.5e-04	.51146 .1407 2.8e-04	.44775 .1367 .0011
LP_l_dispu~s	.28866 .1247 .0206	.31564 .1221 .0098	.26916 .1236 .0294
LP_dismiss	.056187 .1274 .659		
_lowner_2	-.5968 .5506 .278	-.66458 .5463 .224	-.61349 .5422 .258
_lowner_3	-1.857 .9365 .0474	-1.9038 .94 .0428	1.8408 .9405 .0503
_lowner_4	.80171 .5956 .178	.57762 .5608 .303	.40428 .5708 .479
_linv_inc_2	-.85339 .3647 .0193	-.98232 .3504 .0051	-.96282 .3492 .0058
_lco_age_2	1.1087 .6002 .0647	.99793 .5895 .0905	.97591 .5797 .0923
_lco_age_3	1.6744 .6535 .0104	1.605 .6406 .0122	1.5143 .6321 .0166
_lco_age_4	.69596 .6478 .283	.67517 .6239 .279	.68206 .6187 .27
_lco_employ~2	-1.1443 .6245 .0669	-1.0494 .6083 .0845	1.031 .6102 .0911
_lco_employ~3	-.91239 .7044 .195	-.62382 .6527 .339	-.57077 .6567 .385
_lco_employ~4	-1.2466 .6962 .0733	-.96078 .6372 .132	-.9831 .6406 .125
_lhro_2	-.41396 .4337 .34		
_lhro_3	-.88414 .932 .343		
_lreg_2	-.42916 .4674 .359		
_lreg_3	.12628 .4029 .754		

_lexp_2	.26088 1.07 .807	.26781 1.113 .81	.30942 1.108 .78
_lexp_30	-.35899 .6497 .581	-.40868 .6309 .517	-.50643 .658 .442
_lexp_70	-1.2169 1.153 .291	-1.2113 1.09 .266	-1.3928 1.112 .21
_lexp_100	-.7574 .561 .177	-.69638 .5556 .21	-.68277 .5548 .218
LP_ovtime			.4911 .2222 .0271

cut1			
_cons	1.3127 1.028 .202	1.5809 .9445 .0942	2.8872 1.132 .0108

cut2			
_cons	2.6831 1.027 .009	2.9226 .942 .0019	4.2411 1.135 1.9e-04

cut3			
_cons	5.5103 1.11 6.9e-07	5.7514 1.036 2.8e-08	7.1575 1.248 9.6e-09

cut4			
_cons	7.3521 1.176 4.0e-10	7.5672 1.109 9.0e-12	9.0563 1.336 1.2e-11

Statistics			
Pseudo-R-sq	.22026	.21458	.22646
Likelihood ratio Chi-Sq.	99.034	96.847	102.21
Deg. of Freedom_m	22	17	18
Observations	156	157	157
Log-likelihood	-175.29	-177.24	-174.56

legend: b estimates/st. errors/prob.

Regarding the responses to the labor market issues on the right hand side variables is almost similar to the use of instrumental variables to for these labor questions. The values of the coefficients are expected to be positive values having 1 as limiting value. In this context, the estimates of regression coefficients act almost as if they are partial correlation coefficients. The low values of some of the coefficients are an indication of the wide spread of the frequency distribution of the answers to particular issues in relation to the minimum wage issue.

In general, the regression fits are good. The labor market policy responses used in these regressions are as explanatory variables are: payment of cost of severance (LP_sev_c) upon termination of employment; restrictions to fixed term

contracts (LP_fxtc); and disputes resolution (LP_l_disputes). The coefficient estimates are significant at a high level of probability. It is to be noted that dismissal of workers (LP_dismiss) is not significant and is dropped in subsequent models as an explanatory variable.

What is the significance of a high coefficient (in the case of severance costs) compared to a lower coefficient, for instance, as in the case of labor disputes? There is a higher agreement or correspondence of answers among those with a critical view of minimum wage as with those that have high praise for the policy for the minimum wage policy also have high rating for the payment of severance costs. Put in the opposite manner, those that are critical of the minimum wage policy are as critical in their views regarding severance costs.

Such degree of association does not occur in a case when the coefficient estimate is low although they may move in terms of scale in the same direction. This is clearly the case of the lower estimate of the coefficient in the case of labor dispute in relation with the minimum wage. This also happens in the case of the coefficient for fixed term contracts compared to the cost of severance as explanatory variable. In relative terms, this high correspondence happens in a greater amount of cases compared to the same correspondence of minimum wages with the issue of labor dispute processes.

The case of the group interaction variables due to specific characteristics of the respondent firms essentially does not repeat their roles as well as in earlier Models_1 to _5. The reason might be due to the improved statistical fit arising from the use of different explanatory variables that have high correlation with the minimum wage issue. The interaction variables however recede in importance in explaining the regression models.

One group interaction variable that did not play any prominent role in the earlier equation models is the case of fiscal incentives for investments (*Inv_inc*). It is to be noted that the base information for the regression is the set of firms that receive investment incentives. In these later models, the non-recipients of investment incentives tend to have a less favorable opinion of minimum wage policy. The coefficients for this variable are uniformly negative and statistically significant. Their net effect on the regression equation is to reduce the level of support for the minimum wage compared to the recipients of investment incentives.

Summarizing the above, the explanatory variables used which are the responses to specific labor market issues are assumed to have cardinal values instead of the ordinal rankings that are ingrained in the ordering of the various options for each specific issue. At the same time, the dependent variable – the minimum wage responses – are used in their original rank ordering of answers that correspond to specific probability of responses according to the unique distribution of possible answers to the question. The regression results show

produce some interesting outcomes that can have strong indications of correlations with the varieties of answers to the questions. There is a high level of association among the opinions expressed in the survey among the different respondent firms.

V. Conclusion

In this study, the opinions of operating enterprises regarding minimum wage policy are studied with the use of ordered logit regression models. Data limitations on firm economic operations constrained the use of many economic variables in production that could help to test the determinants of the probability that the respondents would give a specific opinion about that labor policy. In particular, the ordered responses would be in the category of very poor, poor, fair, good, and excellent – certainly an ordinal ordering of increasing satisfaction over the policy. The use of specific composition of percent ratios of employees in specific categories do not add any explanatory power for the views expressed on the minimum wage.

Despite this problem, other categorical groupings of the respondents when employed as interaction variables yielded results that reinforce the role of particular groupings of firms that underlay specific influences on the judgments of operating enterprises regarding their judgment of the minimum wage policy. These characteristics involve nature of ownership, market orientation of the firm, age of the enterprise, employment size, among others.

As a result, it is possible to be more specific in pointing toward the appropriate targeting of labor policies that are sensitive to certain objectives of economic policy. If the country wants to expand competitive firms in the economy, it has to listen to their views on costs and on competition. If it wants to reduce the harm that certain policies do to domestic firms, it is useful to frame policies so as to understand what hurts them. If it wants to encourage a wider list of foreign direct investments, it has to reformulate certain policies so that the country's labor policies pertaining to fixed term contracts, to dismissal processes, and to lessening the cost of long and unpredictable holidays need to be examined. The fact that some policies are widely accepted as populist policies with a high degree of favor from many firms does not deter the need to pattern the policies so that they are sensitive to some of their concerns to make the policies more business friendly to them. The end result, of course, would be to help promote the increase of their activities in a robust manner so that they raise the country's competitiveness within an international framework. That would certainly help to raise economic growth and employment. In the end, it also impacts on the conquest of poverty.

Technical Appendix A:

The Ordered Logistic Regression Model

The logit regression model

In the usual linear regression model framework in which the dependent variable y is a binary variable taking a value 1 if the event occurs and 0 otherwise,

$$y_i = \beta'x_i + u_i \quad (1)$$

with $E(u_i)=0$. The probability that the event will occur given x_i is equivalent to the conditional expectation $E(y_i|x_i)$, which is equal to $\beta'x_i$. The value of y is estimated from the linear regression equation $\hat{y}_i = \hat{\beta}'x_i$. It provides the probability of y given the value of x_i . The residuals in this model take only two values, $1-\beta'x_i$ and $-\beta'x_i$. Given the requirement of $E(u_i)=0$, the associated probabilities of these events are equal to $\beta'x_i$ and $1-\beta'x_i$.

Consider now an alternative model in which the response variable y_i^* is defined by the regression model

$$y_i^* = \beta'x_i + u_i. \quad (2)$$

In this case, y_i^* is often not observable. But a dummy variable y is defined by $y = 1$ if $y_i^* > 0$ and $y = 0$ otherwise. (3)

The probability of y^* occurring is given by the conditional expectation $E(y_i^*|x_i)$. From equations (2) and (3), the probability of y_i is

$$\begin{aligned} \text{Prob}(y_i=1) &= \text{Prob}(u_i > -\beta'x_i) \\ &= 1 - F(-\beta'x_i) \end{aligned} \quad (4)$$

where F is the cumulative distribution function for u .

The observed values of y represent the events of a binomial process with probabilities given by (4) and varying from trial to trial depending on the x_i . The likelihood function for this process is given by

$$L = \prod_{y_i=0} F(-\beta'x_i) \prod_{y_i=1} F(1-\beta'x_i). \quad (5)$$

The functional form for F in (5) depends on the assumption made about u_i in (2). If the cumulative distribution of u_i is logistic, then the logit regression model is employed. In such a case,

$$F(-\beta'x_i) = \frac{\exp(-\beta'x_i)}{1 + \exp(-\beta'x_i)} = \frac{1}{1 + \exp(\beta'x_i)}$$

As a result,

$$1 - F(-\beta'x_i) = \frac{\exp(\beta'x_i)}{1 + \exp(\beta'x_i)}. \quad (6)$$

The expression derived is a closed form expression for F because it is not complicated by the presence of any integrals. In contrast, if the cumulative distribution function for F assumes the normal distribution, then the regression model follows the *probit* regression model.

The ordered logit regression model

In this study, the respondents are asked about their opinion of specific policies. Five alternatives are available from which a unique response is made by the respondent. The responses are arrayed so that they indicate rising levels of agreement with the economic policy in question. The model calls for the *ordered logit regression* technique. The regression model therefore seeks to solve the probability that the respondent enterprise i would give one of the specific responses.

To be more general, there are m possible responses or categories of responses in the survey. Each respondent firm i has a choice of expressing a unique opinion among the choices. Suppose m is equal to three choices to begin with. Then the individual respondent falls in category 3 if $u < \beta'x_i$, in category 2 if $\beta'x_i < u < \beta'x_i + c$, and in category 1 $u > \beta'x_i + c$. where $c > 0$. The associated probabilities per category is

$$\begin{aligned} P_3 &= F(\beta'x_i) \\ P_2 &= F(\beta'x_i + c) - F(\beta'x_i) \\ P_1 &= 1 - F(\beta'x_i + c). \end{aligned} \quad (7)$$

In the case of m -ordered categories, probability per category following equations (7) can be written as follows:

$$\begin{aligned} P_m &= F(\beta'x_i) \\ P_{m-1} &= F(\beta'x_i + a_1) - F(\beta'x_i) \\ P_{m-2} &= F(\beta'x_i + a_1 + a_2) - F(\beta'x_i + a_1) \\ &\text{and so on. These equations imply probabilities} \\ P_m &= F(\beta'x_i) \\ P_m + P_{m-1} &= F(\beta'x_i + a_1) \\ P_m + P_{m-1} + P_{m-2} &= F(\beta'x_i + a_1 + a_2) \\ &\dots \\ P_m + P_{m-1} + \dots + P_2 &= F(\beta'x_i + a_1 + a_2 + \dots + a_{m-2}) \end{aligned} \quad (8)$$

and

$$P_1 = 1 - F(\beta'x_i + a_1 + a_2 + \dots + a_{m-2})$$

where $a_1, a_2, \dots, a_{m-2} > 0$. The numbered *cuts* in the reported table correspond to these estimated constants. Computationally, the log-likelihood estimation is performed iteratively. In the case of this study for all the regressions undertaken, the maximum log-likelihood values reach convergence after four iterations. Together with the values of the parameters derived from the estimated *cuts* along the estimated logistic equation, the estimated probabilities can be derived from estimated equations.

The estimation and post-estimation procedures follow the statistical routines utilized in *Stata's* econometric programs for the estimation of ordered logit regressions, employing further interaction calculations for various characteristics of the enterprises when they are clustered according to specific grouping criteria.

In writing this technical appendix, the presentation is patterned after Maddala (1983). Greene (2007) reviewed recently various discrete regression models which includes the ordered logit and probit methods. In general, estimates of the logit and probit models when undertaken and then compared yield relatively close results.

IIII

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