Spring 1-1-2013

Three Essays on Government Expenditures

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THREE ESSAYS ON GOVERNMENT EXPENDITURES

by

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A thesis submitted to the
Faculty of the Graduate School of the
University of Colorado in partial fulfillment
of the requirement for the degree of
Doctor of Philosophy
Department of Economics
2013

This thesis entitled:
Three Essays on Government Expenditures
written by Song Bo Sim
has been approved for the Department of Economics

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Date

The final copy of this thesis has been examined by the signatories, and we find that both the content and the form meet acceptable presentation standards of scholarly work in the above mentioned discipline.

Sim, Song Bo(Ph.D., Economics)
Three essays on government expenditures
Thesis directed by Professor Charles de Bartolome

The analyses in my dissertation are related to how government expenditures are spent and how they should be spent as a whole. In the first chapter, the evidence of manipulation of expenditure is found and the explanation with rational voter is provided. The basic idea is that two types of incumbents will spend more money in their less-preferred sector to attract median voter when they face a small chance of winning in the following election. This expectation is confirmed using a unique Korean local government data set. The fact that there have been two dominant types of parties in Korea, and that expenditures are classified by the social development and the economic development enable this analysis. This analysis is unique in that this is the first empirical analysis trying to see how the opportunistic behavior of incumbent is done according to the probability of winning under heterogeneous preference about composition. The second chapter examines the reason why governments transfer in-kind goods instead of cash. While there have been several analyses of possible explanations for in-kind transfers, the analyses based on a political view are scarce. This analysis provides the empirical evidence supporting the in-kind transfers as a political equilibrium. Two different hypotheses inducing different expected empirical results based on a political view are provided and are tested using cross-county data. The findings show that the in-kind transfers are increasing as the country becomes more democratic and the median voter is more away from median income. The last chapter investigates the relationship between child labor and the participation in CCTs (conditional cash transfers) in Mexico. Since the CCTs are introduced to eliminate child labor and incentivize them to attend school, it has been thought that households with child labor are less likely to participate in the program. This chapter doubts this common belief. Because the conditionality in CCTs is normal goods and child labor could be the result of household characteristics making conditionality more valuable. The estimated probability model shows that households having child labor are actually more likely to apply to the program.

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1. STRATEGIC USE OF EXPENDITURES TO STAY IN OFFICE

1.1 Introduction

Policymakers are not just welfare maximizers, but political agents accounting for being in office. This causes expenditures to be affected politically. As the fiscal system becomes more transparent, several empirical results show that manipulation is done over composition rather than aggregate spending. However, the analysis of composition with heterogeneous preference is scarce. Alesina and Tabellini (1990)[22] (henceforth, AT) provide a model explaining how two different sectors which are preferred by one party are affected by the probability of being out of office (their main conclusion is explanation for when debt is increased, but the debt is increased with the increase of expenditure in their preferred sector). The framework used in this analysis where two parties have their own favored sector is similar to AT in that the two parties have different preferences on the composition of expenditures. However, contrary to the case presented in AT, this analysis finds the opposite case empirically. This does not necessarily imply that this paper tries to test AT's idea because the probability of winning is exogenous in AT while this can be manipulated in the real world. When politicians can manipulate the probability of winning and face a negative shock on their chance of winning in the next election, they are likely to spend more in their less preferred sector to attract the median voter.

The contributions of this paper will be as follows: (1) Contrary to several empirical studies about the political effect on the composition of expenditures, this paper will analyze the composition when two types of incumbents have different preferences about the composition. Previous empirical studies care about the proportion, which is characterized not by the type of party, but by some other factors like the degree of visibility. Therefore, this provides the first empirical analysis of expenditures under heterogeneous preference about the composition. (2) The paper provides a theoretical explanation for the other aspect of opportunistic behavior. Different from previous studies, it shows that the magnitudes of manipulation depend on the magnitudes of shock for their chance of winning.

The paper is organized as follows. Section 2 reviews literature on the political behavior of policymakers. Section 3 introduces the Korean local government data. Empirical specification and results are provided in Sections 4 and 5. Section 6 presents theoretical explanation and Section 7 concludes.

1.2 Literature

The main question of this analysis is how the political incentive of the incumbent affects the composition of government expenditures. But the explanation for incumbents' manipulation of fiscal policy starts from the literature about strategic use of debt. There are two seminal papers that use politics to explain government debt. Persson and Svensson (1989)[61] explain the situation in which a right-wing government is more likely to increase the debt when the probability of defeat is high, while AT show the case where both types of incumbents will increase debt given the low probability of winning in the election. Both papers show different conclusions, but these are simply due to different assumptions: whether the difference in the preference of the

two parties lies in the size of expenditures or in the composition of expenditures. In the sense that debt is increasing to affect the expenditures in the next incumbency, the ideas in both papers are fundamentally similar.

These two papers are extensions of the literature about the political cycle accounting for voters' rationality. Election cycle, explained by Nordhaus (1975)[60] with adoptive expectation, would be eliminated under the rational expectations: voters would not be fooled repeatedly. However, this type of manipulation is still possible when voters care about the competency of the incumbent and when they infer this from the size of expenditures. These papers explaining the political cycle with rational expectations are usually based on asymmetric information. Rogoff (1990)[66] shows the opportunistic behavior when voters cannot observe all expenditures but only a particular type. Shi and Svensson (2006)[69] reconcile the fiscal expansion with rational voters under the framework where voters cannot observe the government deficit. They provide a model showing that debt is more likely to be larger when the incumbent's rent is larger and fiscal system is less transparent. They also confirm this prediction empirically. If asymmetric information is a factor which enables the opportunistic behavior of the incumbent, countries that have a transparent fiscal system may have a less volatile political cycle. That is what confirmed by Alt and Lassen (2006)[1] with their own constructed transparency index for OECD countries.

The theoretical explanations of a political cycle have been developed to incorporate the voter's rationality. Milesi-Ferretti and Spolaore (1994)[57] categorize the literature in this strand into three categories. The first one is about adopting adaptive-expectations which is seminal but criticized based on voters' rationality. The second one is about the strategic use of policy as the signaling under the asymmetric information. The last one is about strategic behavior based on the fact that politicians can manipulate state variables which can change voters' future preference, thus their choice in the

election. The explanation provided in this analysis is related to the second one.

Other empirical tests are provided by several papers. In the sense that this strategic use of debt amplifies the political cycle, some analyses show the positive relationship between stability and the deficit (Crain and Tollison (1993)[26] and De haan et al. (1999)[46]). Pettersson-Lidbom (2001)[62] tests the hypothesis of strategic use of debt using Swedish data. He founds evidence supporting Persson and Svensson (1989)[61] while Franzese (2001) and Lambertini (2003)[53] found no evidence of strategic use of debt. Goeminne and Smolders (2010)[42] also find the evidence to partly support Persson and Svensson (1989)[61] using Flemish data: leftist incumbents run a budget surplus when they are not sure about reelection. But their result does not confirm the budget deficit for the right wing. Because AT and Persson and Svensson (1989)[61] provide different predictions regarding the change in debt in response to the chance of being out of office, the empirical analyses about that could seem to test their ideas. But those empirical tests do not account for the explicit assumptions. They just check if the empirical phenomenon is same as the theoretical predictions provided by the two papers. It's as if the opposite empirical finding in this paper does not imply denial of AT's idea because the probability of winning is not exogenous but manipulable in the real world.

While there is evidence supporting expansionary fiscal policy before an election (Veiga (2002)[75] shows that using Portuguese data), it is less likely to be the case in a developed country. Moreover, some analyses even find that voters punish the incumbent who increases expenditures before the election (Vergne (2009)[76]). In this respect, it is likely that total expenditures are less likely to be used as the politically strategic variable under a transparent fiscal system, but the possibility that the composition will be affected still remains. Schneider (2010)[67] shows that there is no significant change in

total expenditure and debt before an election while the government increases social security expenditures at the state level using German data.

In line with this view, several analyses examine the effect of an election on the composition of expenditures rather than the level of spending. Using Colombian data, Drazen and Eslave (2010)[31] show that manucipilities are likely to increase pork barrel spending such as spending on roads and schools which is highly visible, while reducing current expenditures. Veiga and Veiga (2007)[74] and Kneebone and McKenzie (2001)[51] also show similar results using Portuguese and Canadian data. Vergne (2009)[76] uses cross-country data to show that current expenditures are increasing before an election. Schuknecht (2000) [68] also finds evidence supporting manipulation of composition, but showing the increase in capital expenditures rather than current expenditures.

While there have been analyses about the manipulation of the composition, they do not account or fail to confirm the parties' different preferences on composition. The analysis here shows interest in how two different fields which are preferred by two parties are affected politically. Brender and Drazen (2009)[18] question if the change in party really induces the change in the composition of spending. They used the index constructed from cross-country panel data showing the composition of spending and found that there is a significant change two years after the election. One reason that there has been no test under heterogeneous preferences about composition of expenditures is the difficulty of obtaining the data. There is only one analysis which provides evidence supporting the idea presented in AT by using experimental data and supporting it (Sutter (2003)[71]). With the result from experimental data, he argues that the main reason for scarce evidence of the strategic use of deficit is unaccounted variables. That problem would be severe with cross-country data having a lot of heterogeneity which should be controlled out. Haan and Sturm (1994)[30] analyze what would affect the level of debt.

They show that stability, ideology and the power dispersion index are main factors. Gonzalez (2002)[43] and Brender and Drazen (2005)[17] also show that the political cycle is amplified as the society becomes more democratic. For this reason, it is desirable to use data from a single country.

The most common problem in estimating the political effect is that neither the policy nor the result of an election is exogenous. To deal with this endogeneity problem, Goeminne and Smolders (2010)[42] estimate the share of votes for the incumbent. They consider the previous share of vote, fiscal policies like tax and expenditure, and number of government parties and unemployment rate as explanatory variables. They also show that the fiscal policy in neighboring municipalities is a significant variable. Then, using this expected share of votes, they construct the dummies indicating expectation of reelection. Pettersson-Lidbom (2001)[62] also adopts a similar approach. Using the indication of reelection, he estimates the probability of reelection based on the state dummy representing the pattern on government change. Carmignani (2003)[22], Pinho (2004)[63] and Eslava (2011)[37] provide the summary of the literature on public debt in a view of politics.

1.3 Sample and Variables

When the political effect is examined, the single-country time series usually suffers from a lack of observations, especially because the election is not an annual event. Cross-country data must come with heterogeneity, which is difficult to control. Particularly, the differences in the institutional and electoral system are difficult to control when panel data over many countries is used. In this respect, the local government data in a single country would seem to be ideal. Therefore this analysis adopts the local government data from Korea. In Korea, the mayor and local council are elected every 4 years

Tab. 1.1: Descriptive statistics

Variable	1998	2002	2006
Social (%)	41.6 (8.13)	39.8 (7.17)	42.30 (7.03)
Economic (%)	33.3 (8.13)	35.4 (7.63)	33.97 (7.21)
Conservative	0.39 (0.5)	0.45 (0.50)	0.62 (0.49)
Liberal	0.31 (0.46)	0.32 (0.47)	0.22 (0.42)
Majority	16.8 (27.9)	3.78 (24.65)	10.05(25.57)
EPW	10.6 (11.61)	5.65 (12.80)	17.56 (14.30)
Old (% of aged over 60)	14.48 (5.3)	17.25 (6.67)	18.15 (7.20)
Young (% of aged between 5 and 20)	21.41 (2.07)	19.21 (2.68)	17.72 (3.15)
Farm (% of farmers)	28.85 (17.33)	24.81 (15.61)	23.34 (15.16)
Population	154.15 (165.42)	161.29(183.01)	168.07(200.65)

Notes: Mean value. SD in parenthesis. Majority is the difference in the number of votes between incumbent and winner. EPW is instrumented majority explained in the following section.

(except the first election in 1995, and the second in 1998). All of these elections are held in June. For this reason, it is conceptually ambiguous whether the expenditure in the election year is under the control of the current incumbent. The mayor proposes the draft of expenditures to the council by the end of the previous year, and they can ask for a revision, but that has been the rare case. The expenditures are classified into five categories: administrative cost, social development, economic development, civil defense and other expenses. Social and economic development categories contribute about 70% of total expenditures, and the present analysis focuses on these two types of expenditures. Social development expense includes the money spent in education, culture, health, amenities and social welfare programs. Economic development includes the money spent in agricultural or fishery industries, technology, transport and infra-structure.

Summary statistics are reported in Table A.10. Because this analysis focuses on the effect of the probability of winning, the variation of incumbent types matters. Table 1.2 shows the variation of the type of incumbent over

Tab. 1.2: Variation of type of incumbent

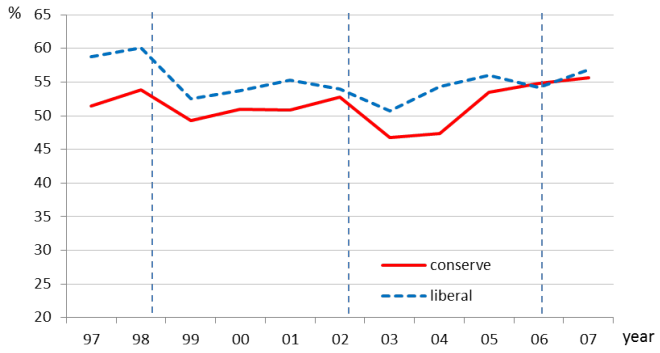
	Overall		Between		Within
Type	Freq.	%	Freq.	%	%
Conservative	317	52.14	112	73.68	70.76
Liberal	163	26.81	73	48.03	55.82
Independent	128	21.05	86	56.58	37.21
Total	608	100	271	178.29	56.09

Notes: For 608 cities (152 cities *times* 4 incumbencies). 112 cities have had a conservative incumbent. Among 112 cities, 70.76% of them have always had a conservative incumbent.

608 observations (152 cities $\times$ 4 incumbencies). The first column shows the overall distribution. Among total observations, 52.14% have a conservative incumbent. The second column shows that 73.68% of all observations, ever, had a conservative incumbent at least one time. The last column shows that 70.76% of the cities that had a conservative incumbent have always had a conservative one.

It is not obvious before implementing the statistical analysis, but the right-wing (or conservative) may favor large expenditures in economic development, and the left-wing (or liberal) is more likely to favor the expenditures in social development. Figure 1.3 shows the rough trend of the proportion of social expenditure by the type of incumbent. It seems that the conservative party is more likely to spend less in the social sector (the trend of ratio to total expenditure and trend of total expenditures per capita are presented in appendix). If this is the case, examining the expenditure in two sectors will provide a chance to observe behavior where two parties have their own preferred sector. The other thing I can see is that the conservative party acts similarly to liberal party at the election year of 2002 and 2006, while tending to diverge after the election.

The data used here cover from 1997 to 2007. The elections are held in 1998, 2002 and 2006. Thus, during the sample period, there are 4 terms



(a)

Fig. 1.1: Trend of expenditure

Notes: Dotted lines indicate election years. Percentage is calculated as social/(social+economic). The trends of level value are depicted in the appendix.

of office. The total expenditures are available up to the latest year. But, the classification has changed since 2007, so when I calculate the percentage of the two categories (social and economic development) after 2007, it may lose consistency. Therefore, the data is limited to 2007. Over these periods, the sample covers 152 cities in 5 states. Therefore, the yearly observations should be 152×11=1,672. However, for some areas, the data before 2000 and 2002 are not available; thus, observations used are less than that.

In some cities, incumbents ran for election after they had left their previous party. They may simply have changed their party because they are at variance with party opinion or because they failed to receive the nomination of their party. In this case, the opportunistic behavior depends on the time point, which determines whether they assure they will run in the election with changing sides. Also, the majority in the following election, which is used as the proxy of μ (the magnitudes of the shock on the preference for the incumbent) is complicated to calculate. Thus, these cities are dropped. Also, all observations when the incumbent is independent are excluded. When in-

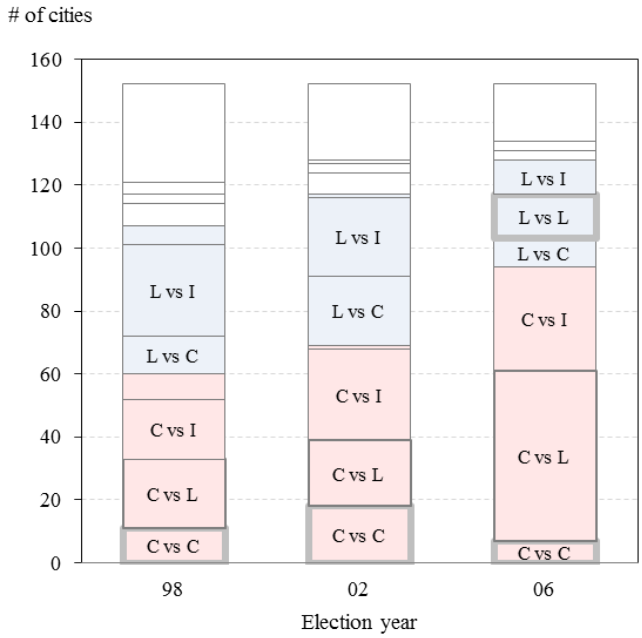


Fig. 1.2: Type of incumbent and challenger

Notes: 'incumbent type' vs. 'challenger type'. The challenger is defined as the second winner when an incumbents succeed in being reelection or the winner if the incumbent is unsuccessful. C, L and I stand for conservative, liberal and independent. The slot without label indicates cities where the incumbent type is independent or did not run for next election.

cumbents are independent, their manipulation may depend on the type of challenger, thus they are dropped. But when the challenger is independent, they are still included. It may be safely assumed that the independent challenger lies between the conservative and liberal incumbents on the preference line (i.e., α for independent incumbent lies between α^I and α^C). When the independent incumbents are included with the indicators, it turns out that they are not significantly different from a liberal one.

In Korea, there have been two main parties representing the right and left, and an additional small conservative party, especially popular in one

particular state. There was the other left-wing party, which stemmed from the main liberal party, but they merged back again around 2006. Most cities have candidates from the two main parties. But some areas are inclined to right-wing or left-wing. In those areas, one of them competes with the same type of party or an independent candidate. Because the behavior of the incumbent may depend on the type of challenger, it should be accounted for. Figure 1.3 shows the type of the incumbent and challenger at each election. The thick border block indicates the proportion of cities where the same type of party competes with each other (conservative vs. conservative or liberal vs. liberal). At this time, rather than accounting for the effect of the competition between the same types, the two results with and without these cities are reported. In the 1998 election, 55% and 32% of the winners are elected by conservative and liberal party respectively. 23% of the winners are independent. 62%, 22% and 16% at the 2002 election and almost the same proportions for the election in 2006, are observed.

1.4 Specification

There may be two types of model for opportunistic behavior of incumbent. One is about signaling based on asymmetric information. Voters don't know the exact preferences of the incumbent, thus the incumbents try to look like their preference is similar to voters' and voters respond to this manipulation. The other type of explanation is about changing the state-variable. Without the asymmetric information assumption, incumbents make the situation in which forward-looking voters prefer the incumbent to the challengers. Rather than explaining based on one of them, the following frame shows how the sign of $\partial g_t/\partial \mu$ is determined.

Voter i (denoted by subscript i) and party j (denoted by superscript

$j \in \{I, C\}$) have different preferences for two types of public goods, and this heterogeneous preference is parameterized by $\alpha_i, \alpha_j \in [0, 1]$. The incumbent gets additional utility from being in office (χ) while the voters have a particular preference for the incumbent (γ_i). γ_i is the non-fiscal utility from incumbent for voter i regardless of spending, thus that is exogenous. This reflects any incumbent-specific preference shock which varies over time according to the particular political events. The utility functions for voters and parties are:

$$\alpha_i U(g_t) + (1 - \alpha_i) U(f_t) + \gamma_i \tag{1.1a}$$

$$\alpha^j U(g_t) + \left(1 - \alpha^j\right) U(f_t) + \chi; \quad j \in \{I, C\} \tag{1.1b}$$

Assume $\alpha_i \sim U[0, 1]$, $\alpha^I < 0.5 < \alpha^C$ and $\gamma_i \sim U[\mu - 1/(2k), \mu + 1/(2k)]$. Then, two parties represent two groups of voters and g_t is the spending in the sector party 'C' prefers. Because γ_i shows how much voter i is inclined to vote for the current incumbent regardless of the allocation of resources, it's mean μ could be represented by the instrumented majority used in the estimation section.

In each period, the income m is exogenously given and incumbent allocates resources into two sectors presented by g_t and f_t. Therefore, the spending g_t in the sector where preference is represented by α determines the spending in the other sector, $f_t = m - g_t$. Elections are assumed to be held every two periods. The voters observe incumbent's spending in two sectors and vote at the beginning of the second period.

The incumbents' problem is maximizing the two-period utility by choosing g_t

$$\max_{g_t} \alpha U(g_t) + (1 - \alpha) U(m - g_t) + P(g_t, \mu) U_2^w + (1 - P(g_t, \mu)) U_2^L \tag{1.2}$$

where $P(g_t, \mu)$ is the probability of winning in the next election which depends on g_t and μ. U_2^w and U_2^L are the utility in the second period when incumbent wins and loses respectively. Incumbents can implement their own preferred policy and being in the office provides office-rents (χ), thus the utility in the second period depends on their winning. The first order condition will be given by

$$\alpha U'(g_t) - (1-\alpha)U'(m-g_t) - U_2^L P_{g_t} + U_2^w P_{g_t} = 0 \tag{1.3}$$

The optimal rule requires equating the sum of marginal utility from two public goods is equal to the marginal expected gain from the change in the probability of winning. Total differential would yield

$$\frac{\mathrm{dg}_t}{\mathrm{d}\mu} = -\frac{P_{g_t\mu}\left(U_2^w - U_2^L\right)}{P_{g_tg_t}\left(U_2^w - U_2^L\right) + \alpha\, U''(g_t) + (1-\alpha)U''(m-g_t)} \tag{1.4}$$

This condition shows the change in the optimal level of g_t according to the change in μ. Notice that $U_2^w - U_2^L$ is always positive, thus the sign will be determined by $P_{g_t\mu}$,$P_{g_tg_t}$ and relative magnitudes of $\alpha U''(g_t) + (1-\alpha)U''(m-g_t)$. If both $P_{g_t\mu}$ and $P_{g_tg_t}$ are negative, then $dg_t/d\mu$ is negative with the assumption of the strict concavity of utility function $U()$.

The specification to see the sign of $\partial g_t/\partial\mu$ empirically (how the expenditures are affected politically, mainly by the election) is provided. Ideally, it focuses on how incumbents adjust the expenditures in their preferred sector. First, to see the election and partisan effects on expenditures in social and economic development, the expenditures level and calculated ratio are regressed on the election dummies and ones interacted with the type of party with several covariates. Some expenditures may be spent based on the plan

over several years, thus some portion of expenditures in each year would be affected by the value in previous year. To account for this dynamic effect, the specification, including lags of dependent variables, is also tried. The length of lag is adjusted to capture this effect sufficiently. Both level and composition of expenditures are investigated as the dependent variable y_{it} in the specification. When composition of expenditures is examined, the percentage of social expenditures to the sum of social and economic expenditures (=social/(social+economic)) is used. By using the ratios of expenditure in two sectors instead of the level itself, it focuses on the manipulation on the composition of expenditures. Subscript it denotes a city i and year t. The regression form and variables used are as follows:

$$\begin{aligned} y_{it} = \alpha + \sum_{n=1}^{N} \rho_n y_{it-n} + \sum_{j\neq 2}^{4} \beta_{1j} elect_j + \beta_2 con_{it} + \beta_3 EPW_{it} + \sum_{j\neq 2}^{4} \beta_{4j} elect_j \times con_{it} \\ + \sum_{j\neq 2}^{4} \beta_{5j} elect_j \times EPW_{it} + \beta_6 EPW_{it} \times con_{it} \\ + \sum_{j\neq 2}^{4} \beta_{7j} elect_j \times EPW_{it} \times con_{it} + X'_{it}\gamma + \eta_t + \theta_i + \varepsilon_{it} \quad (1.5) \end{aligned}$$

where the variables are:

$elect_j$: indicator of year (j=1:after election, 3:before election, 4:election)

con: value of 1 when the incumbent is conservative

EPW: instrumented probability of winning (the majority in the next election)

vector X is covariates as:

old: ratio of those aged over 60 to total population

young: ratio of those aged between 5 and 20 to total population

farm: employee in agriculture as ratio of total population

pop: population
η_t: year-specific effect
θ_i: unobserved city-specific effect

This specification is for the case where the lagged dependent variable is included. When that is missed, specification is exactly the same except the second term.

The election cycle is expected to be captured by three indicators $elect_j$ where j denotes the number of years after the election. The second year after the election is considered as the base year, so three indicators are included: each indicator indicates right after the election ($j = 1$), the year immediately before an election ($j = 3$), and the election year ($j = 4$). To see the difference in the types of parties, the interaction terms with party indicator are also included. Some demographic characteristics are included as the covariate X because they may affect the structure of expenditures. Year dummies are also included in every regression though the coefficients of them are not reported. These dummies are for controlling out unobserved effect in same year across cities. When indicators for incumbency are used instead of year dummies, there is no remarkable difference. Unobserved city-specific terms are allowed in the error term to control heterogeneity over cities. The variables mentioned up to this point are to see overall political cycle, but it would not reveal how a incumbent is affected by his probability of reelection.[1] To see this, EPW (Expected Probability of Winning)[2], which is the proxy of shock on the preference to the incumbent, is included.

[1] It is worth mentioning the difference between the political cycle and the manipulation. The manipulation, which is the main interest in this analysis, is referred to as the reaction to the probability of winning while political cycle is expected to be captured by year dummies $elect_j$.

[2] In fact, this EPW is not probability but instrumented majority in the next election. It should be seen as the constructed value as the proxy of μ (indicating how much voters are inclined to incumbent).

This effect of EPW definitely could be different for two types of incumbents, and it also could vary as the election gets close. To account for these effects, EPW is interacted with the indicator of conservative party (con) and also with the indicator of year ($elect_j$). EPW is calculated based on the difference in the vote of share between incumbent's party and the winner (second winner when incumbents succeed in their reelection) in the next election using the result of the next election ex-post, so a clear majority means a higher EPW. This majority depends on the exogenous shock such as the variation in the popularity for incumbents' party. Additionally, if the opportunistic manipulation exits and it really works, the majority would be the function of not only this exogenous shock but also the incumbents' manipulation. Borrowing the notation from the previous section, the probability of winning is the function of expenditure g_t and the mean of non-fiscal utility from incumbent μ. Because this analysis investigates the opportunistic manipulation for increasing the probability of winning, I need the proxy of the probability of winning, which is only related to the exogenous shock. To get the proxy for μ, the majorities in the following election are regressed on the year dummies, state dummies, majority in the previous election and incumbent's age. To allow the difference in the effect of year, the interaction terms are also included. Table 1.3 presents the results for this regression. I return to this regression below.

The main estimated equation (3.7) includes n-order lagged value of the dependent variable. The immediate problem in estimating this equation is dynamic panel bias caused by the lagged dependent variable and fixed-effect in the error terms. This bias will be weakened as T (time period) increases, but the sample used here has a larger n, thus, that is not negligible. There are several ways to resolve the dynamic panel bias issue. Anderson and Hsiao (1982)[3] suggest using previous value as instrument variable after differencing to purge the fixed-effect (differencing is preferred to demeaning because

Tab. 1.3: First-stage regression of probability of winning

	(1)		(2)	
	Majority in the following election			
Conservative	6.178	(7.757)	11.29*	(6.103)
Year 02	-11.91	(7.420)	-12.77*	(6.678)
Year 06	-8.821	(14.31)	-15.75	(9.788)
Year 10	7.989	(16.09)	2.197	(13.25)
Conservative × Year 02	12.48	(11.65)	8.869	(8.519)
Conservative × Year 06	28.86***	(9.658)	27.61***	(8.029)
Conservative × Year 10	-5.198	(9.257)	-11.41	(6.922)
Ln (Previous majority)	5.365***	(1.775)	5.804***	(1.828)
Low level of education	-16.25**	(6.806)	-16.21***	(6.025)
Ln (Incumbent's age)	-28.49	(18.73)		
Incumbent was politician(=1)	8.203	(7.233)		
Population	-0.130***	(0.0494)	-0.101**	(0.0415)
Farm	-0.722	(0.757)	-1.112*	(0.664)
Old	3.978	(2.609)	4.132	(2.848)
Young	6.079	(3.793)	4.341	(2.892)
1st quartile of age			8.396*	(4.411)
_cons	-36.89	(106.6)	-113.1	(98.12)
N	178		178	
$Fstat.$	5.88		10.16	
R^2	0.497		0.493	

Notes: F-stat is only for additional exogenous variables. Using the same fixed effect model as in the main equation. 'Low level of education' is the indicator having 1 if incumbents did not graduate high school. '1st quartile of age' is the indicator having 1 if incumbent is young as much as he is in the 1st quartile. Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

it allows more possibility of using lagged values as the instrument variables). Their idea leads to several IV and GMM estimations. Kiviet (1995)[50] proposes the correction for the bias in LSDV (Least-squares dummy-variables) estimates those are known to have relatively small variance. System-GMM method is proposed by Blundell and Bond (1998)[15] which uses moment

conditions, (1.6a) and (1.6b).

$$E(y_{is}, \Delta\varepsilon_{it}) = 0 \quad \text{for} \quad s \leq t-2 \tag{1.6a}$$

$$E(\Delta y_{it-1}, \theta_i + \varepsilon_{it}) = 0 \tag{1.6b}$$

The idea that lagged values are used as an instrument variable is similar to Anderson and Hsiao (1982)[3], but Arellano and Bond (1991)[5] propose GMM-style, incorporating all possible lagged values. To generate moment conditions, other methods rather than differencing are also possible, and orthogonal deviation is adopted here[3]. After orthogonal deviations, the possible lagged values are used as instrument variables to generate moment conditions equation (1.6a). The other right hand variables such as the demographic characteristics safely could be considered as exogenous so they are instrumented with themselves instead of using lagged value.

With this moment condition (1.6a), equation (1.6b) is also proposed to create an additional moment conditions to increase efficiency (Arellano and Bover (1995)[6], Blundell and Bond (1998)[15]). System-GMM estimates incorporating these additional moment conditions are reported in the Appendix. Throughout all the estimations, two-step standard errors adjusted for finite sample are used to calculate test statistics.

As mentioned above, the proxy of exogenous shock in the estimated equation, EPW is the instrumented majority in the following election. The first-stage regression is reported in Table 1.3. The regression is implemented by including all exogenous variables in system and additional instrumented variables. These IVs are interaction terms of conservative indicator and year dummies, previous majority, level of education, age and job for incumbent.

[3] Subtracting the average of all future values (Arellano and Bover (1995)[6]). The point of transformation is eliminating the correlation between explanatory variable and the error term. In this analysis, adopting orthogonal deviations have additional advantage as avoiding the problem of differencing over a different incumbency.

All of these variables are predetermined regardless of expenditures, so could be used to instrument the actual majority. Voters may have different preference for politicians and non-politicians (persons who are not involved in party activities). To account for this, the indicator of the politician is included. The first column reports the result when all these IVs are included. It shows that, as the incumbent was elected with a clear majority, he could expect more votes in the following election and his age is associated negatively with a clear majority. Politician is more likely to be elected with a clear majority, but statistical significance is not found. A more educated incumbent is more likely to be elected as expected. The coefficient of population is estimated with negative sign indicating that a populated area has more diverse political preferences. The F-stat, which is the important criterion in determining the validity of instrument variables, is turned out to be kind of low. Thus, in second column, the indicator of job is dropped and the indicator of the 1st quartile of age (indicating the youngest group of incumbents) is included instead of the logarithm of age. The specification in the second column is used to instrument majority.

1.5 Results

Equation (3.7) is estimated and the results are reported in both ways: including and without a lagged dependent variable. The level of expenditures is examined first, and the following subsection investigates the composition of expenditures.

Tab. 1.4: Election and partisan effect on the level of expenditures

	Without lagged dependent variable				GMM estimates with lagged dependent variable			
	Actual majority (1)		Instrumented majority (2)		Actual majority (3)		Instrumented majority (4)	
y_{t-1}					0.631**	(0.251)	-0.220	(0.174)
y_{t-2}					-0.191	(0.193)	-0.360***	(0.0581)
Elect1	185.6	(172.5)	329.0*	(196.7)	164.5	(319.4)	220.1	(165.6)
Elect3	-95.83	(80.49)	-40.14	(91.89)	73.42	(234.4)	41.90	(109.1)
Elect4	686.0***	(207.8)	711.0***	(249.1)	527.8	(429.5)	194.1	(174.1)
Conservative	119.3	(111.5)	89.05	(196.4)	-497.4	(540.5)	-242.8	(217.0)
EPW	2.326	(4.447)	-7.196	(5.309)	-1.815	(19.13)	8.195	(5.884)
Elect1×Con	-121.6	(142.8)	-155.5	(139.3)	629.5	(582.4)	20.41	(106.7)
Elect3×Con	-141.9	(90.73)	0.0676	(89.46)	-335.6	(217.4)	79.76	(126.7)
Elect4×Con	-351.3***	(129.7)	-161.7	(131.5)	269.9	(484.4)	-19.94	(189.3)
Elect1×EPW	-5.323	(4.992)	6.390	(4.299)	4.330	(17.37)	-0.559	(2.615)
Elect3×EPW	-2.327	(2.207)	0.334	(2.556)	-7.328	(16.80)	-4.364	(4.288)
Elect4×EPW	-5.463	(4.071)	0.244	(4.810)	15.17	(39.66)	-2.298	(5.573)
EPW×Con	-5.529	(6.016)	10.65**	(4.144)	41.63	(26.62)	7.257	(6.216)
Elect1×EPW×Con	1.677	(6.556)	-8.160	(5.136)	-47.47	(41.36)	-1.620	(3.704)
Elect3×EPW×Con	4.206	(4.299)	-5.312*	(3.164)	20.80	(22.98)	1.557	(4.798)
Elect4×EPW×Con	7.385	(5.556)	-7.336	(4.999)	-52.31	(44.58)	-4.223	(5.531)
Population	0.411	(1.275)	0.983	(1.408)	-1.155	(5.795)	0.481	(1.930)
Farm	-32.41*	(17.92)	-35.80*	(18.21)	-24.40	(44.16)	-51.62***	(19.82)
Old	278.0***	(72.93)	271.6***	(73.30)	203.6	(151.1)	112.5	(151.4)
Young	-138.1*	(77.51)	-136.4*	(81.52)	-238.8	(184.1)	-415.1**	(182.9)
_cons	551.9	(2361.7)	439.7	(2365.8)				
N	934		915		501		501	
R^2	0.380		0.358					
Number of cities					121		121	
Number of inst.					40		33	
AR(2) test					0.402		0.703	
OIR test					0.139		0.393	

Notes: The dependent variable is expenditures in the social and economic sectors. (1)(3) EPW is the actual majority in the next election (2)(4) EPW is the instrumented majority. Standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Two-step S.E. adjusted for finite sample in parentheses. m_2 for autocorrelation and Hansen statistic for OIR.

1.5.1 The Effect on the Level of Expenditures

A large literature reviewed in Section 2 has found manipulation on the level of expenditures, though the focus of this analysis is on the composition of expenditures. Therefore, before examining the manipulation on composition,

Table 1.4 reports the results when the level of expenditures is used as the dependent variable to see if manipulation is also done over the level of expenditures itself. Because the expenditures in the economic and social sectors are our focus, the sum of the expenditures per capita in the two sectors are used. The first two columns present the results when the lagged dependent variable is not included, while the following two columns report the results with considering dynamics and estimated with GMM method. As the proxy of μ, the actual majority is tried in the odd number column, and instrumented majority is tried in the even number column. Regarding the overall pattern, the results in first two columns confirm that expenditure in the election year is significantly high while it's not significant when dynamics are considered as seen in the last two columns. This suggests possibly different results when dynamics are considered in the following section where the effect of an exogenous shock on the composition is examined. Except the second column, the significant effect of EPW is not confirmed. The result in the second column shows the negative sign of EPW, implying the liberal party will increase the expenditures in base year (two years after the elections) when they face a low chance of winning. But this effect is not statistically significant. The conservative party will respond differently to the chance of winning as the sign of the coefficient of $EPW \times Con$ is positive and significant, but the sum of these two coefficients is not statistically different from zero (-7.196+10.65). While hard evidence for manipulation is not found using level of expenditure, it is still possible that there is a manipulation on the composition. As the previous literature points out, it is easier to adjust the composition instead of the level itself for the policy maker. It is to this topic that I now turn in the following section.

1.5.2 The Effect on the Composition

The manipulation on the composition of the expenditure is examined in this section. Before presenting the estimates of equation (3.7), a simplified version is tried and presented in Table 1.5. This simplified version does not allow the degree of manipulation to vary over the election cycle by dropping the interaction term of $Elect_j$ and EPW. As seen in Table 1.4, it could be confirmed that the coefficients of EPW and $EPW \times Con$ are biased. In the second and forth column where instrumented majority is used, the coefficient of EPW is estimated positively. This implies that the liberal incumbents decrease the social expenditures (increase economic expenditures relatively) when they face low winning chance. To see how this manipulation is done over election cycle, following table show the estimates of equation (3.7).

Table 1.6 presents results when a regression is done with dropping lagged dependent values, and FE estimations are adopted. The first column presents the result without terms related with EPW to see the overall pattern first. Second column reports the result using the actual majority instead of the instrumented majority (constructed value as the proxy of μ). The results in the third column could be seen as the main result as it uses the instrumented majority to see how they respond to the exogenous shock on their preference.

Regarding the overall pattern in the first column, it shows that both type of incumbents decrease expenditures in social sector after the election and increase before the election. The significant difference between two parties is not statistically confirmed. The estimated coefficients show that the expenditures in the social sector is about 3.56-4.34 percent points higher before the election than the base year throughout all specifications in three columns. With this overall political cycle, to see if the probability of winning affects this cycle, a similar estimation including EPW is implemented.

In the second column, the majority in the following elections are used without being instrumented, while the third column uses the instrumented

Tab. 1.5: Election and partisan effect on expenditures

	Without lagged dependent variable				GMM estimates with lagged dependent variable			
	Actual majority		Instrumented majority		Actual majority		Instrumented majority	
	(1)		(2)		(3)		(4)	
	Social (%)		Social (%)		Social (%)		Social (%)	
y_{t-1}					0.373***	(0.0886)	0.530***	(0.0670)
y_{t-2}					-0.161**	(0.0635)		
Elect1	-4.419**	(2.148)	-5.025**	(2.357)	5.666***	(1.856)	4.428***	(1.618)
Elect1×Con	1.224	(1.097)	1.502	(1.143)	1.434	(1.892)	1.085	(1.680)
Elect3	4.227***	(1.042)	3.971***	(1.030)	0.377	(1.212)	1.762	(1.302)
Elect3×Con	1.127	(1.185)	1.342	(1.182)	4.226***	(1.488)	3.094**	(1.550)
Elect4	-2.435	(2.713)	-3.191	(2.924)	0.591	(1.260)	1.369	(1.384)
Elect4×Con	2.090	(1.381)	2.077	(1.369)	4.259***	(1.403)	2.999**	(1.467)
EPW	0.0422*	(0.0244)	0.0678*	(0.0378)	0.0603	(0.0767)	0.103***	(0.0385)
EPW×Con	-0.0755**	(0.0321)	-0.0870***	(0.0298)	0.0103	(0.104)	-0.0721**	(0.0283)
Conservative	0.482	(2.005)	0.251	(1.980)	-2.909	(1.886)	-3.287*	(1.776)
Population	-0.00367	(0.0209)	-0.0178	(0.0207)	-0.0384**	(0.0194)	-0.0569***	(0.0176)
Farm	-0.00167	(0.157)	-0.0246	(0.157)	0.298*	(0.168)	0.160	(0.137)
Old	-0.593	(0.646)	-0.778	(0.631)	-1.608**	(0.785)	-2.471***	(0.720)
Young	1.010	(0.634)	0.904	(0.661)	1.388	(0.960)	0.933	(0.611)
_cons	41.50**	(20.21)	50.14**	(19.22)				
N	934		915		501		628	
R^2	0.186		0.186					

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

majority. It is expected that the coefficients of EPW in less-preferred sector is biased upwards. When the increase in the less-preferred sector leads to a clear majority, the majority must be positively correlated to error terms. This means that the coefficients for EPW and $EPW \times Con$ in the second column are biased downwards and upwards respectively. This is what is confirmed in column (3). The second column shows that conservative incumbents increase the expenditures in the social sector in base year when they face a low winning chance with a negative sign of the coefficient of $EPW \times Con$. When instrumented variables are used, it can be shown that the magnitudes of this

Tab. 1.6: Election and partisan effect on expenditures (without lag)

	Only time dummies		Actual majority		Instrumented majority	
	(1)		(2)		(3)	
	Social (%)		Social (%)		Social (%)	
Elect1	-3.887*	(2.185)	-4.389**	(2.103)	-5.390**	(2.380)
Elect3	4.337***	(1.048)	4.415***	(1.005)	3.563***	(1.061)
Elect4	-2.064	(2.679)	-2.597	(2.665)	-3.279	(2.941)
Conservative	0.696	(1.941)	0.805	(2.085)	1.382	(2.092)
EPW			0.0140	(0.0336)	0.0859*	(0.0441)
Elect1×Con	1.160	(1.068)	0.627	(1.182)	0.394	(1.274)
Elect3×Con	0.971	(1.181)	1.322	(1.339)	-0.543	(1.439)
Elect4×Con	1.953	(1.376)	1.611	(1.502)	0.299	(1.590)
Elect1×EPW			0.00968	(0.0388)	-0.0243	(0.0354)
Elect3×EPW			0.0578**	(0.0279)	0.00400	(0.0346)
Elect4×EPW			0.0332	(0.0343)	-0.0485	(0.0359)
EPW×Con			-0.0588	(0.0500)	-0.155***	(0.0383)
Elect1×EPW×Con			0.0203	(0.0444)	0.0723*	(0.0400)
Elect3×EPW×Con			-0.0739	(0.0510)	0.0706*	(0.0394)
Elect4×EPW×Con			-0.00863	(0.0506)	0.131***	(0.0431)
Population	-0.00624	(0.0212)	-0.00330	(0.0211)	-0.0155	(0.0203)
Old	-0.550	(0.632)	-0.635	(0.653)	-0.758	(0.633)
Young	1.052	(0.641)	1.029	(0.635)	0.906	(0.665)
Farm	-0.0137	(0.159)	-0.00400	(0.156)	-0.0106	(0.159)
_cons	39.98**	(20.02)	41.69**	(20.36)	49.38**	(19.34)
N	936		934		915	
R^2	0.177		0.192		0.196	

Notes: Dependent variable is the ratio of social expenditures to the sum of social and economic expenditures. Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

coefficient increases (from -0.0588 to -0.155 by comparing the second and the third columns). This indirectly reveals that the manipulation is done to attract voters and it really works. In the third column where instrumented values are used, the strategic behavior of the incumbent is revealed more well. The liberal incumbents react to the probability of winning in the opposite direction: they increase social expenditures when they face a high chance of

winning.

These results are still confirmed when dynamics are considered. Table 1.7 reports the results when the lagged dependent variables are included so dynamics are accounted. Several estimation methods are tried to deal with the dynamics in the equation (3.7), and GMM estimates are reported here. The lengths of lag are determined so that the autocorrelation between one period is essentially expunged. The first and second column include two lagged values, but the third column includes only one lagged value. With additional variables mainly related to probability winning, the strong autocorrelation disappears with just first lags of the dependent variables. As expected, it shows the dependency on the previous value. The null hypotheses that there is no autocorrelation and that the instrument variable is valid failed to be rejected. The autocorrelation tests for the error terms are implemented and the p-values are reported where null hypothesis is that there is no correlation between error terms over two periods. This test is based on the differenced equation. Therefore, the correlation between error terms over one period is natural ($Cov(\Delta\varepsilon_t, \Delta\varepsilon_{t-1}) \neq 0$). For the validity of the instrument variable, the over-identification test statistics are reported with the corresponding p-value in the last row.

Regarding overall pattern in the first column, when dynamics are considered, it reveals a little different pattern from that in Table 1.6. The expenditures in the social sector show the decrease in the year after elections in Table 1.6. Nevertheless, when lagged dependent variables are included as in Table 1.7, it shows the opposite case: the expenditures in the social sector increase. Also, the increase before the election is confirmed only for the conservative parties.

The most interesting coefficients are those on EPW and $EPW \times Con$. In the second column those coefficients are estimated as positive and statistically not significant. As those coefficients are biased, it can be seen in the

Tab. 1.7: Election and partisan effect on expenditures (including lag)

	Only time dummies (1) Social (%)		Actual majority (2) Social (%)		Instrumented majority (3) Social (%)	
y_{t-1}	0.428***	(0.0695)	0.380***	(0.0881)	0.555***	(0.0646)
y_{t-2}	-0.141**	(0.0561)	-0.148**	(0.0746)		
Elect1	5.676***	(1.581)	7.167***	(2.072)	3.443**	(1.523)
Elect3	0.657	(1.221)	1.947	(1.761)	0.927	(1.366)
Elect4	0.357	(1.494)	2.152	(1.795)	0.466	(1.352)
Conservative	-1.504	(1.708)	-2.532	(2.452)	-2.045	(1.801)
EPW			0.0559	(0.100)	0.125***	(0.0410)
Elect1×Con	-0.0435	(1.525)	1.284	(2.876)	0.257	(1.559)
Elect3×Con	3.588**	(1.516)	6.573***	(2.395)	0.774	(1.712)
Elect4×Con	3.901**	(1.567)	5.483***	(2.017)	2.425*	(1.457)
Elect1×EPW			0.144	(0.132)	0.0305	(0.0638)
Elect3×EPW			-0.0560	(0.120)	-0.0558	(0.0360)
Elect4×EPW			-0.129	(0.108)	-0.0869**	(0.0359)
EPW×Con			0.0674	(0.155)	-0.151***	(0.0380)
Elect1×EPW×Con			-0.192	(0.230)	0.0111	(0.0717)
Elect3×EPW×Con			-0.139	(0.177)	0.172***	(0.0494)
Elect4×EPW×Con			0.00455	(0.139)	0.140***	(0.0532)
Population	-0.0418**	(0.0183)	-0.0486*	(0.0291)	-0.0530***	(0.0171)
Farm	0.296*	(0.165)	0.263	(0.161)	0.123	(0.130)
Old	-1.501*	(0.830)	-2.091**	(1.002)	-2.410***	(0.647)
Young	1.588*	(0.844)	2.195**	(0.963)	0.935	(0.574)
N	501		501		628	
Number of cities	121		121		123	
Number of inst.	68		68		70	
AR(2) test	0.585		0.514		0.185	
OIR test	0.580		0.620		0.764	

Notes: Dependent variable is the ratio of social expenditures to the sum of social and economic expenditures. Two-step S.E. has been adjusted for finite sample in parentheses. All possible lagged values are used to generate moment conditions without restriction. m_2 for autocorrelation and Hansen statistic for OIR. Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

third column that when the instrumented majority is used, the manipulation is confirmed. The sign of coefficient of EPW is positive and coefficient

of $EPW \times Con$ is negative. These indicate that in base year, the liberal incumbent would increase the expenditures in the economic sector while decreasing expenditures in the social sector when they feel like being out of office in the following election. The coefficient on $EPW \times Con$, which shows how conservative incumbents differently respond to the chance of winning in base year, is estimated as negative. This indicates that the conservative party reacts in exactly the opposite direction as the coefficients of EPW show opposite signs. This reaction to the probability of winning, which could be seen as the opportunistic manipulation would vary as the election is approaching. It could be severe as the election is approaching or the manipulation is done earlier to maximize the effect. These coefficients of interaction terms $Elect_j \times EPW \times Con$ are estimated positively for conservative incumbents. These estimated coefficients reveal that the manipulation is done mainly in the first two years after the election. For a liberal incumbent, the manipulation is dominant in the year after the election. It is interesting to see how the conservative and liberal party react to the chance of winning in two sectors. It is especially consistent with the expectation of opportunistic manipulation in that they reduce economic expenditures while increasing social expenditures when they face a low probability of winning.

It is not obvious why the manipulation is mainly done in the second period and it is alleviated as the election approaches, but one possible explanation would be that the probability of winning becomes less adjustable as the election nears. The key assumption for main prediction made in theoretical section is that voters cannot observe incumbent's true preference so that incumbents can adjust their chance of winning by adjusting expenditures. Therefore, if incumbents feel that the spending made close to the election is less visible, or voters had guessed the incumbent's preference earlier, there will be less incentive to manipulate.

There has been a suggestion for the reliable range of the estimated co-

efficient of a lagged term that it should lie between the coefficient of LSDV and OLS. Because each estimated coefficient is sure to be biased upwards and downwards respectively. These have been checked. For instance, in the third column, the coefficient of a lagged one-period dependent variable is in this credible range, between 0.302 and 0.639.

1.5.3 Robustness Check

When a lagged term is included to account for dynamics, the estimation method gets complicated to avoid the bias problem caused from the fixed effect. While the LSDV estimator is not consistent, it provides a credible range of the estimate and the results are straightforward to interpret. Also, when the bias in LSDV is corrected, it outperforms other estimators especially when n is small (Kiviet (1995)[50]). The LSDV and bias-corrected LSDV estimates are presented in Table A.2. As the results in column (1) and (2), the bias-corrected estimates are similar to those of LSDV, but those are estimated with a slightly larger standard error. Compared to other estimations, it shows strongly significant manipulation for both types of incumbents. The results that the positive sign of EPW and the negative sign of $EPW \times Con$ remain same.

The system GMM estimation is proposed mainly for the case that the lagged levels are not valid instruments for the first differences. This is the case in particular when the variables strongly depend on the previous values. As the magnitudes of coefficients of lagged terms are not that large, and the test statistics show the validity of instruments, there is no strong reason to adopt system-GMM. For comparison, however, the results from system-GMM are reported in Column (3) in Table A.2. Similar to GMM results reported in previous Table, it shows the evidence of manipulation in two year after the elections, but it is not statistically significant.

The first and second columns in Table A.3 present the results when cities are dropped, if the challenger is independent. In the first column where lagged values are not included, the coefficient of $EPW \times Con$ is estimated to be negative and is statistically significant consistent with the previous results. But when lagged values are included, the directions of sign are still the same, but are no longer statistically significant. Until now, the dependent variable has been social spending as the percentage of social spending plus economic spending. The results in columns (3) and (4) in Table A.3 use the differently calculated ratio (expenditures in each sector to total expenditure) instead of the original ratio (social / (social + economic)). Column (3) presents the results when the dependent variable is social expenditures as percentage of all expenditures and column (4) presents results when the dependent variable is economic development expenditures as a percentage of all expenditures. By using the proportion of total expenditure, it would reflect better an increase in social or economic expenditures by reducing the expenditures in other sectors, although this ratio to total expenditures could be affected by the uncontrolled change in other sectors. The results for the social sector show that the main findings still remains same in that the coefficient of $EPW \times Con$ is significantly negative and the coefficient of EPW is positive. The opposite findings are confirmed in the economic sector.

1.6 Concluding Remarks

If our tax is spent by others for their own purpose, it should be investigated. One of the most likely cases we can think of would be the strategic use of expenditure by the incumbent in office. This paper finds the evidence supporting strategic use of expenditure using unique a Korean local government data set. The basic idea is that two types of incumbent will spend more

money in their less preferred sector to attract median voter when they face a low chance of winning in the following election. The empirical finding supports this prediction particularly for conservative incumbent. The fact that there have been two dominant types of party in Korea, and that expenditures are classified by social development and economic development enable this analysis. This analysis is unique in that this is the first empirical analysis trying to see how the opportunistic behavior of incumbent is done according to the probability of winning under a heterogeneous partisan preference on composition of expenditures. Also, it is interesting because it provides empirical evidence which is contrary to the theoretical prediction by AT(1990). This difference in results is explained by allowing the probability of winning to be endogenous, while it is not in their analysis.

The contribution of this paper could be three-fold. First, this provides the evidence of opportunistic manipulation when expenditures are classified according to preference of two type of incumbents. In previous literature, how the political cycle appears on the composition with accounting heterogeneous partisan preference is not investigated. Second, this analysis further confirms that the magnitude of this manipulation depends on the chance of winning in the following election. That means if they expect clear majority in the next election, they are less likely to try manipulation. Third, this paper tries to characterize when this phenomenon could happen even when the voters know the magnitudes of exogenous shock. Even when voters suspect that the change in expenditures could be a result of political incentives, the manipulation still could exist because voters could not distinguish the political incentives from the real reflection of incumbents' preference.

2. IN-KIND TRANSFERS AS THE POLITICAL EQUILIBRIUM

2.1 Introduction

Many authors have asked why governments implement in-kind transfers, which involves an efficiency loss, instead of cash (in-kind transfers are goods-specific regardless of the means of supporting, like subsidies. Trading with other goods is not allowed or, at least, involves a cost). There have been normative explanations based on paternalism, externalities and complementarities with labor supply. But the empirical evidence is mixed, and there seems to be no strong evidence. Though there have been arguments for paternalism and externalities, it is hard to find strong empirical evidence supporting these arguments and they have been criticized (Browning (1975)[19]).

Another possible explanation for the role of in-kind transfers is that they are a consequence of the democratic process of choosing governments by voting. The majority of voters prefer in-kind transfers to cash for reasons such as self-targeting property and pecuniary effect. This paper is motivated by the intuition that, if the in-kind transfers are the consequence of the democratic process, then the ratio of in-kind transfers should be affected by the degree of democracy and the characteristics of the median voter. Based on which aspect of in-kind transfers is dominant, two different testable hypotheses are provided. Using cross-country data, my results show that the use of in-kind transfers increases as a country becomes more democratic, and as the median

voter becomes poorer. These results imply that the targeting role of in-kind transfers is emphasized in the process of determining the type of transfers to be used, whether cash or in-kind.

The expected contribution of this paper is as follows: (1) Provide new empirical evidence to explain the difference in the ratio of in-kind transfers across countries. (2) Provide different theoretical explanations of why a government provides in-kind transfers.

The paper is organized as follows. Section 2 provides a literature review. Sections 3 and 4 discuss the specification, data and the expected results based on two different hypotheses. Section 5 includes results and Section 6 concludes.

2.2 Literature Review

In an idealized world, a government would give aid in the form of a cash transfers as cash allows the recipient to spend the aid in a way which gives him the greatest amount of utility. Rationales for in-kind transfers have been provided based on paternalism (Thurow (1974)[72], Beseley (1988)[11]), externalities (Garfinkel (1973)[41], Giertz and Sullivan (1977)[40]) and improvement in efficiency. These views are based on the supply side. In-kind transfers must be implemented to maximize social welfare by taking account of externalities and interdependent preferences between donors and recipients. Another reason might be that the recipients prefer in-kind transfers due to self-targeting property of in-kind transfers (Nichols and Zeckhauser (1982)[59], Besley and Coate (1991)[12]) or the pecuniary effect. While these factors are involved politically because recipients are also voters, there have been no analysis to examine how in-kind transfers are determined politically.

Several papers show how the level of a publicly provided good is determined by majority rule. Fernandez and Rogerson (1995)[38] characterize the equilibrium of publicly provided schooling where the poor are excluded. Epple and Romano (1996a)[35] show the equilibrium where the coalition of the poor and the rich exclude the middle group when top-up is not allowed. Epple and Romano (1996b)[36]) and Gouveia (1997)[44] characterize the equilibrium by majority voting where top-up is allowed. Blomquist and Christiansen (1999)[14] show that publicly provided private goods could be a political equilibrium which is also efficient.

But these papers do not explain why these goods are provided as in-kind program even though that could be purchased in the market by transferring cash. They start with the utility function consisting of publicly provided goods always financed with tax. So there is no room for analyzing the different effect of in-kind and cash.

The only paper which explains in-kind transfers by combining the self-targeting and political view is Bearse et al. (2000)[10]. They present the model where, if the tax system is weak, the median voter supports in-kind transfers because the rich would opt-out from low-quality publicly provided goods. This opting-out of the rich increases the amount of aid allowed to be granted to the poor. This implies that developing countries are inclined to use in-kind transfers because their tax systems are not as rigorous as those of developed countries.

The other strand of literature focuses on the pecuniary effect of in-kind transfers (Coate, Johnson and Zeckhauser (1994)[25] , Finkelstein (2007)[39], Coate (1989)[24], and Usher (1977)[73]). These papers account for the difference between in-kind and cash transfers in the market as cash would affect demand in the market. Cunha et al. (2011)[27] empirically found that price is lower under in-kind transfers compared to when transfers are made in cash using Mexican data. Their results show that in-kind transfers act as addi-

tional supply and reduce the price where supply is not elastic. The analysis here attempts to test which role of in-kind transfers is more relevant in a political equilibrium, the self-targeting property or the pecuniary effect empirically.

Hessami and Uebelmesser (2012)[48] analyze how the in-kind share is determined by political factors. Using OECD countries data, they show two things: A left-wing government is inclined to transfer cash but is more likely to use in-kind transfers when they experience high inflation. By using the ratio of in-kind transfers as a dependent variable, their specification is closest to the analysis here. However, the main difference between the analysis here and Hessami and Uebelmesser (2012)[48] is that, while they find political factors which are affecting the ratio of in-kind transfers, the analysis here attempts to explain how the use of in-kind transfers could be a political equilibrium. The result presented by Hessami and Uebelmesser (2012)[48] is that a left-wing government increases in-kind transfers to protect beneficiaries from inflation. But they still do not provide a general explanation why governments use in-kind transfers, and why right-wing governments use in-kind transfers.

There is a literature which examine how government size is determined through the voting process (Meltzer and Richard (1981)[55], Meltzer and Richard (1983)[56], and Gouveia and Masia (1998)[45]). In that they investigate the effect of relative median income on government expenditures, this analysis is similar to them. But this analysis focuses on how voters choose between cash and in-kind transfers by investigating the ratio of in-kind transfers while accounting for the degree of democracy.

2.3 Specification

My estimation is based on the idea that, if in-kind transfers are a political consequence, then the share of in-kind transfers depends on the degree of democracy and the income share of the median income group. Using cross-country data with controlling out the heterogeneity across countries by a fixed effect model, the specification is

$$y_{it} = \alpha + \beta_1 democracy_{it} + \beta_2 median_{it} + \beta_3 median \times democracy_{it} + \gamma X_{it} + \delta_t + \eta_i + \varepsilon_{it} \tag{2.1}$$

where y_{it} is the percentage of in-kind transfers, *democracy* is the degree of democracy, and *median* is income share held by the median group explained below. X is covariates such as GDP per capita, population density, transfer income from abroad, openness (measured by the trade in GDP) and unemployment rates. *median* is income share held by the third quintile (40-60%), which captures the relative change for median group. Usually, the income distribution is positively skewed (skewed to the right), thus a smaller *median* means more inequality in countries (i.e. the direction of relative change for lower income group is same as that for median group). The Gini index is also tried as the proxy of median income because the Gini index presents inequality, and more inequality usually associates with lower median income. The results using Gini index are reported in Table A.6. The coefficient of interest is β_3. The idea of inclusion of the interaction term is that median voters' preference is more revealed as the country becomes more democratic. δ_t and η_i are unobserved country and time fixed effects. X also includes indicator of left-wing, inflation, and the interaction term to reflect the result of Hessami and Uebelmesser (2012)[48]. The sign of β_3 would depend on the following two hypotheses. Both of the following two hypotheses provide how

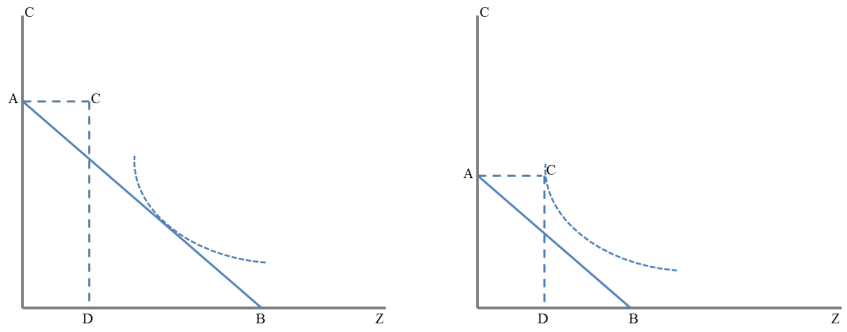
in-kind transfers could be political equilibrium. The first one is based on the self-targeting property of in-kind transfers. The second one is based on the pecuniary effect.

Hypothesis I: The beneficiaries prefer in-kind transfers because with better targeting, they receive a larger transfer as the non-poor opt out. As the median voter has less income, he can expect better targeting because his take-up cost is reducing.
Hypothesis II: The beneficiaries prefer in-kind transfers because, when governments provide in-kind transfers, the price will be lower than when only cash is transferred [1]. This is because in-kind transfers usually involve additional production. This benefit will be larger for high income earners.

These hypotheses are about the effect of median income. However, it should be emphasized that, as country becomes more democratic, the decisive voters get closer to the median voter. Given the specification which includes the interaction term, the effect of median income depends on the coefficient β_3. Therefore, the hypotheses above eventually provide the expected sign of β_3.

Hypothesis I describes the self-targeting property of in-kind transfers. When even a social program is implemented using means-testing, beneficiaries self-select into the program. Take-up cost may include the dis-utility from the difference between their optimal level and the given level from in-kind transfers as well as the stigma cost (Moffitt (1983)[58]). And it is well known that the take-up cost is increasing as the beneficiaries has more income. The take-up cost may occur due to the restrictions, not only on quality, but also

[1] The lower price with additional production is essential in Hypothesis II. It might be controversial in that price could increase in case of some in-kind transfers like health-care. But Hypothesis II only mentions the pecuniary effect of lower price. If in-kind transfers leads to higher price, the pecuniary effect provides a same prediction with the Hypothesis I.



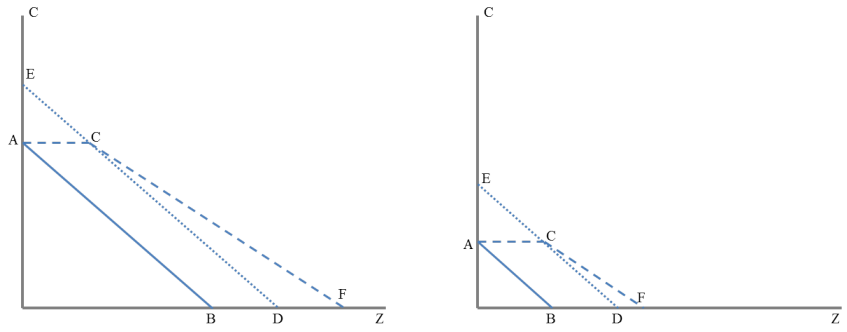
(a) The rich (b) The poor

Fig. 2.1: Self-targeting property of in-kind transfers

on quantity. When supplement is not allowed technically or legally, it will impose the cost to the potential beneficiaries.

Two hypotheses could be explained using the example of child care services. There would be two different ways to provide child care service for government:transferring cash and let them purchase services in the market, or giving vouchers while government provide additional child care services. When cash is given, more potential beneficiaries will ask for it compared to when a voucher is provided. With limited resources, potential beneficiaries can expect more when a voucher is provided. Thus, according to Hypothesis I, as median income goes down relatively, beneficiaries will prefer voucher to cash transfers.

Figure 2.1 shows the situation described in Hypothesis I. Assume there are two goods, c and z (which are publicly provided). The line AB indicates the original budget line for both the rich and the poor. The expanded budget line ACD indicates the available choice when they participate in an in-kind program. Top-up is not allowed, thus their choice of z is limited to D when they participate in the program, or they can choose their own optimal level on their original budget line with opting-out. Then, the rich are more likely



(a) The rich (b) The poor

Fig. 2.2: Heterogeneous effect of in-kind transfers by income

to opt out, as seen in Figure 2.1. The poor's choice is made on the expanded budget line while the rich made their choice on their original budget line.

Hypothesis II, however, provides a different reason why beneficiaries would prefer vouchers to cash transfers. When cash is transfered to purchase child care service in the market, the price is higher compared to when the government provides additional child care service. This benefit from reduced price gets larger for high-income earner. For this reason, Hypothesis II predicts that as median income goes up, they prefer voucher to cash transfers.

The equation (2) and (3) describe the situation when government transfers G in cash and in-kind forms to individuals respectively to explain Hypothesis II. In addition G, individuals can supplement in the market if they want. In the case of (2), where the amount of G is transferred via cash, beneficiaries' budget simply increases as much as G. The price (P_2) of publicly provided goods(z) would be lower than when cash is given (P_1). For this reason, it is assumed that the government has the technology to provide goods with constant marginal cost or both government and suppliers in the market have constant MC, but supplier acts as monopolist for some reason (supply in the market is not perfectly elastic). This pecuniary effect becomes weaker when the median voter has a lower income as seen in Figure 2.2.

Tab. 2.1: Predicted sign of coefficients

	Hypothesis 1 (Self-targeting property)	Hypothesis 2 (Pecuniary effect)	
Predictive sign of β_3	$-$	$+$	Decisive median voter has more power in more democratic countries

$$\max_{c,z} U(c,z) \tag{2.2}$$
$$s.t.\ c + p_1 z = y + G$$

$$\max_{c,z} U(c,z) \tag{2.3}$$
$$s.t.\ c + p_2 (z - G/p_2) = y$$

Figure 2.2 shows the budget line in two situations for the rich (a) and for the poor (b). The original budget line is AB. With cash transfers, the budget line expands to ED. With in-kind transfers, budget line would be ACF. The distance AC represents the in-kind transfers, and the flatter slope of CF indicates the decline in the price. The benefit from the reduction of the price would be smaller for the poor compared to that for the rich. It should be mentioned that top-up is not allowed in Hypothesis I while it is in Hypothesis II.

Two different arguments have predicted different sign of coefficient as described in Table 2.1. Those hypotheses doesn't provide anything about the

prediction of the sign of β_1 and β_2[2], but they produce distinct predictions about the sing of the coefficient (β_3) of interaction term. Thus, it provides the framework in which the alternative effect causing the in-kind transfers as the political equilibrium could be tested. As median voter has less income, he may prefer in-kind (Hypothesis I) for self-selection role or may prefer cash as the pecuniary effect becomes small (Hypothesis II). Which effect is dominant is an empirical question.

2.4 Data

The data comes from Asian Development Bank (ADB) and IMF's Government Finance Statistics. Those data show the expenditures on health, education, housing and social security. The former three categories could be easily considered as the in-kind transfers. The expenditures on these categories are limited to a specific purpose[3], but the expenditures on social security may contain both in-kind and cash transfers. I believe most of the proportion of this category is cash, but subsidies like food stamps might be included in this category. Unfortunately, the category is not specific enough to distinguish them. But as long as the changes in that proportion in countries are not that volatile, those effects with fixed-effect model would be moderate[4]. Therefore,

[2] Two hypotheses are related to the median income, thus when *median* is included alone without an interaction term, the sign of β_2 could tell which hypothesis is more likely, given that the country is sufficiently democratic. As specification an includes interaction term to account for heterogeneity in democracy, β_2 itself could not be predicted based on those hypotheses.

[3] As mentioned earlier, the criterion of in-kind transfers is whether transfers are limited to certain purposes. A price subsidy might be transferred via cash, but that is considered as an in-kind transfer.

[4] In case of USA, the percentages of food stamp in social protection is 2.8%, 3.8% and 5.4% (=\$68B/\$1,264B) in 2001, 2005 and 2010 respectively.

the ratio of the expenditures on thr former three categories are used as the ratio of in-kind transfers.

For the measurement of democracy, I consider measurement from Freedom House. Freedom House provides two indicators, 'Political Rights' (PR) and 'Civil Liberties' (CL). Those are measured on a scale of 1 to 7. A lower score originally means the higher degree of freedom, but I have converted as a higher score means it is more democratic for ease of reference.

There were many variations during the end of the 1980s in terms of the measurement of democracy, thus it is desirable to use the data over that period. But, the sample period is 1990 to 2010 because ADB and IMF data is available since 1990. One of the reasons that the data from Asia, Latin America and Eastern Europe are chosen is that the variations of democracy index in these areas are relatively greater than those in other countries such as western European or OECD. The countries included in the regression are listed in Table A.4 [5]. Other economic variables (inflation, GDP, population, median income, Gini index, openness, transfers, unemployment rates) come from the World Bank. The indicator of a left-wing government is also acquired from Database of Political Institutions 2010 at the World Bank. This data set contains the indicator of the party orientation in office based on their economic policy.

Table A.10 shows the overall and within variation of variables of interest included in the regression. Most variations come from between countries as expected, so there will be a loss of efficiency with fixed-effect model. But the ratio of in-kind transfer is affected by several factors such as tax (progressive or regressive) and institutional systems, which are hard to control if an overall variation is used. From Table A.10, it could be seen that the ratio of in-kind transfers varies from 9.8% to 96.9%. Argentina, Uruguay and

[5] Even though the sample includes some OECD countries, excluding those countries does not affect the main finding as explained in the results section.

Tab. 2.2: Descriptive statistics

Variable	Mean	Std.Dev.	Between SD	Within SD	Min	Max
In-kind	.4933	.2229	.2329	.0515	.098	.969
CL	5.13	1.14	1.26	.4045	1	7
Median^a	14.58	2.15	2.02	0.52	9.63	18.71
Median^b	0.68	0.07	0.07	0.02	0.54	0.82
Gini index	41.97	9.82	9.45	2.32	24.85	62.78
Left	.4	.4914	.4407	.2700	0	1
Infation	53.18	286.05			-4.04	2735.49
GDP per	.0041	.0041			.0002	.0349
Population Density	.0900	.0881			.0055	.3834
Transfers	.0031	.0117			-.0323	.1114
Openess	.8002	.3859			.1375	1.90
Unemployment rate	9.46	6.34			1.1	37.3

Notes: For samples included in the third column in Table 2.3. SD is standard deviation.
Median^a is income share of 3rd quintile.
Median^b is the ratio of income share of 3rd to 4th quintile.

the Ukraine show overall low ratios of in-kind as the average is below 20%. Macedonia and Jamaica show high ratios of in-kind over 90%. This may reflect the different classification of expenditures in different countries rather than the actual difference in in-kind ratio. This provides another reason for using within-variation even if there is an efficiency loss [6].

The establishment of left-wing government is closely related to the degree of democracy and high inequality could cause the advent of left-wing. So three variables of interest may suffer from multicollinearity, but at least the correlation table does not show a high correlation among these variables. The correlation between *Gini* and left-wing indicator is -0.11. Those for Gini and CL is 0.04. The correlation among variables is reported in Table A.5.

[6] When I use overall variation or within-region variation instead of within-country variation, all significances disappear. The ratio of in-kind varies from 10% to 97% over countries. It may be difficult to control out their heterogeneity using within-region variation.

2.5 Results

Tab. 2.3: The effect of democracy on in-kind transfers measuring Median by income share of 3rd quintile

Dependent: In-kind	(1)	(2)	(3)
CL		-0.00966	0.202**
		(0.525)	(0.014)
Median^a		0.00941	0.0733***
		(0.334)	(0.007)
Median^a×CL			-0.0141**
			(0.017)
Left	0.0242	0.000529	0.0162
	(0.141)	(0.984)	(0.466)
Left×Inflation	-0.0969	-0.0374	-0.104
	(0.452)	(0.764)	(0.291)
Inflation	-0.00796	0.0250	0.0289
	(0.869)	(0.496)	(0.499)
GDP per capita	-1.954	-4.890	-0.683
	(0.298)	(0.323)	(0.909)
Population density	-3.003***	-4.705***	-4.203***
	(0.000)	(0.000)	(0.000)
Transfers	0.763***	-0.0632	-0.402
	(0.010)	(0.887)	(0.445)
Openness	-0.0651**	-0.0856*	-0.0613
	(0.030)	(0.056)	(0.116)
Unemployment	-0.00685***	-0.00493*	-0.00350
	(0.007)	(0.093)	(0.246)
_cons	0.970***	0.914***	-0.137
	(0.000)	(0.000)	(0.733)
N	336	160	160
R^2	0.289	0.426	0.473

Notes: p-values in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Median^a is income share of the 3rd quintile.

Table 2.3 shows the result of estimation of Eq. (2.1). Column (1) first shows the result without the degree of democracy, median income and interaction term. It shows the basic result which could be compared to the result from Hessami and Uebelmesser (2012)[48]. While they find positive sign of

an interaction term between inflation and the indicator of a leftist government, that is not the case here. Using OECD data, they argued that a leftist government is more likely to react to inflation with increasing in-kind transfers, while they are inclined to transfer cash. Their results show the negative sign of $left$ and positive sign of interaction term of $left$ and $inflation$. This may reflect the difference between OECD and developing countries.

While these covariates (inflation rates and the indicator of leftism) have no significant effect, those are included throughout Tables 2.3 and 2.4. Inclusion of them costs additional loss of sample due to missing observation. When I drop them in order to save observations, the results still remain qualitatively the same (reported in Table A.7). In the second column, the results without an interaction term are presented while the third column shows the estimates when an interaction term is included. 'Civil Liberties' is used as the degree of democracy in columns (2) and (3). How much median voters affect policy would depend on how much democratic countries are, thus, an interaction term is expected to capture this effect. As the interaction term is not included, the coefficients for degree of democracy and median income turn out to be not statistically significant as seen in column (2). In the third column, however, the coefficients of the interaction terms between *median* and the degree of democracy (CL) have a negative sign supporting the effect from 'Hypothesis I' is dominant.

Given the positive sign of *median*, this implies that the effect of *median* is negative when CL has the larger value than 5.2 (=0.0733/0.0141). This result indicates that when CL is 6, in-kind transfers are 1.13 percent lower as median income is decreased by 1 percent. The effect of median income is depicted in Figure A.2.

Similarly, the effect of democracy also depends on the median income. As the median income increases, the effect of democracy on in-kind transfers is negative. For example, in the third column, the results indicate that when

median income share is more than 14.3 percent, the effect of democracy becomes negative. Table A.6 presents the result of similar specification using Gini index instead of *median*. A larger Gini index indicates less median income, thus the opposite sign of β_3 is expected and these are confirmed.

The sample includes some OECD countries, but the results remain the same even after omitting those countries. In the results in Table 2.3, the number of observations is reducing to 126, and the coefficient of interaction term is still estimated as -0.0189 significantly at 5 percent level.

Because the results support the story under Hypothesis I, the relative ratio of median income share is additionally tried. The story under Hypothesis I is more likely when the median voter has less income, and the somewhat wealthier group has more income, so that the rich are more inclined to opt-out. For this reason, Table 2.4 reports results when the ratio of income share (income share of 3rd quintile / income share of 4th quintile) is used as the median income share[7].

In Table 2.4, the coefficients of interaction terms are estimated as significantly negative and they are estimated more significantly. This result may be another evidence for that self-targeting property is the factor making median voters prefer in-kind transfers.

Throughout the results, the coefficient of population density shows negative sign possibly implying that the cost of in-kind transfers are reducing in populated country due to the economies of scale[8]. The coefficients of transfers are expected to have a positive sign because the foreign aid is usually specified for a particular program. However, it turns out to have an insignificant negative impact. The coefficients of unemployment rates show negative

[7] The ratio for the 3rd quintile to the 5th quintile(the wealthiest group) is also tried, but it shows less significance. In a sense of relative ratio to the close group, the ratio to the 4th quintile seems to be more appropriate.

[8] To achieve a given level of in-kind transfers, a populated country will have a lower cost. It may be safely assumed that the marginal cost of providing in-kind transfers is decreasing.

Tab. 2.4: The effect of democracy on in-kind transfers measuring the Median using a ratio of the 3rd and 4th quintile

Dependent: In-kind	(1)	(2)
CL	-0.00925	0.362***
	(0.552)	(0.002)
Median^b	0.222	2.755***
	(0.583)	(0.001)
Median^b×CL		-0.529***
		(0.002)
Left	0.000532	0.0166
	(0.983)	(0.447)
Left×Inflation	-0.0208	-0.142
	(0.872)	(0.159)
Inflation	0.0168	0.0321
	(0.695)	(0.525)
GDP per capita	-4.920	0.843
	(0.326)	(0.886)
Population density	-4.716***	-4.007***
	(0.000)	(0.000)
Transfers	-0.0316	-0.258
	(0.946)	(0.602)
Openness	-0.0861*	-0.0449
	(0.063)	(0.187)
Unemployment	-0.00499*	-0.00269
	(0.094)	(0.320)
_cons	0.901***	-1.008*
	(0.001)	(0.072)
N	160	160
R^2	0.423	0.505

Notes: p-values in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Median^b is the ratio of income share of the 3rd quintile to the 4th quintile.

sign implying that most supporting program for unemployment consists of cash transfers.

The results in Table 2.3 and Table 2.4 do not account for the possibility of the dynamics of in-kind ratio. But the ratio of in-kind transfers could be affected by the previous value, then the standard error would be underestimated. To account for these dynamics, the lagged in-kind ratio is included in the original specification and the results are reported in Table

Tab. 2.5: Results including lagged dependent variable

Dependent: In-kind	LSDV	GMM
In-kind$_{t-1}$	0.619***	0.957***
	(0.000)	(0.000)
CL	0.225**	0.0623*
	(0.021)	(0.052)
Median^b	1.582**	0.516**
	(0.048)	(0.047)
Median^b×CL	-0.332**	-0.0931**
	(0.020)	(0.033)
Left	-0.00679	0.00280
	(0.548)	(0.666)
Left×Inflation	-0.142**	-0.112***
	(0.011)	(0.007)
Inflation	0.0695*	0.0146
	(0.062)	(0.352)
GDP per capita	1.791	-1.222
	(0.409)	(0.475)
Population density	-0.786	
	(0.111)	
_cons	-0.787	-0.268
	(0.137)	(0.195)
N	177	177
R^2	0.676	
AR(2) test		0.776
OIR test		0.177
Number of Inst.		32
Number of Countries		39

Notes: p-values in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
m_2 for autocorrelation and Hansen statistic for OIR.
Two-step S.E. adjusted for finite sample are used.

2.5. When a lagged dependent variable is included in a panel estimation, the correlation between lagged variable and error term causes bias. That may not be severe when T (time period) is large, but that is not the case here (T in these estimations is 20, but panel is unbalanced). However, LSDV (Least Squares Dummy Variable), which ignores the potential correlation, still provides straight estimates and are reported in columns (1) and (3) in Table 2.5, while system-GMM estimations are reported in the even number columns. Larger T compared to the number of countries produce too many

moment conditions. Thus some covariates included in previous estimations are dropped (openness, transfer and unemployment rates). Also, the moment conditions are produced with a limited lagged value of the dependent variable. In the first two columns, the coefficients of interaction terms are estimated as significantly negative supporting 'Hypothesis I'.

2.6 Concluding Remarks

This paper attempts to find the evidence of in-kind transfers as the political equilibrium. Previous literature suggests that there is no dominant justification for in-kind transfers and I am suggesting that the political process could be another possible explanation. The basic idea in this paper was that, if in-kind transfers are implemented politically, the ratio of in-kind transfers must be affected by the degree of democracy and the median income. Based on two distinctive predictions, this paper provides the frame to test which aspect of in-kind transfers is dominant. It finds that, as the country becomes more democratic and the median voter has less income, the proportion of government expenditure through in-kind transfers is increasing. As the proxy of median income, both the third quintile and Gini index are tried. These results are consistent with the prediction that the role of self-targeting is a dominant aspect of in-kind transfers. As this prediction is made under the assumption that in-kind transfers involves self-selection process and top-up (supplementation with provided transfers) is not allowed, this does not assure that self-targeting is a solely emphasized aspect of in-kind transfers. Also, as in-kind transfers are assumed to decrease the price in the market, it does not exclude the effect from increased price. However, even welfare programs with means-testing also involve self-selection at least partially and

take-up cost could be imposed even when top-up is allowed. Also, these results at least confirm that the extent of in-kind transfers is determined by the degree of democracy and the median income, which reflects the voting process. The results in this analysis predict that if inequality becomes larger in a democratic country, the in-kind transfers will increase.

3. THE EFFECT OF CHILD LABOR ON PARTICIPATION IN CCTS

3.1 Introduction

Conditional cash transfers provide cash transfers conditional on the consumption of normal goods, or human capital goods such as schooling and health care. This unique type of social program is dominant especially in Latin America, and is being expanded to Asia and Africa. Because the main motivation of this program is to get the children out of work and put them into school, the analysis about how child labor affects the participation in the program is important. Child labor could act as two different factors in view of participation in the program. The first one is opportunity cost. As the program requires children to be out of work (or, at least, to attend school), households have to give up the earned income that would have come from the child's participation in work. The second one, which has been ignored in the literature, is that child labor might be the proxy of unobserved household characteristics that cause child labor. The subject of a great deal of debate, poverty is considered to be the cause for child labor. Other factors, such as intra-household problems and an incomplete labor market have also been discussed. The former one could be observed well relative to the latter one, but some features like their liquidity assets have hardly been observed. The latter one is also difficult to be observed. Depending on what really causes child labor and which effect is dominant, child labor could have a positive or

negative effect on participation in the program.

Using the data from Mexican urban areas where the large opportunity cost of schooling is blamed for low participation rates in CCTs, this analysis attempts to investigate the effect of child labor on take-up of the program. Considering the main objective of CCTs, the effect of child labor has important implication for policy makers. It is not only about whether the program is designed well, but also about the rationality of the program. Contrary to the common belief, this analysis shows that households with child labor are actually more likely to participate in CCTs.

3.2 Literature Review

Take-up analysis has been adopted to investigate the determinants affecting the participation of various social programs, particularly means-tested programs involving self-selection. Since Moffitt (1983)[58] analyzes non-participation in welfare programs using AFDC data, several papers had conducted applications to social assistance program (Blundell et al. (1988)[16] for housing benefit programs in the UK, Supplementary Benefits in Duclos (1995)[32], Income Support in Hernandez et al. (2007)[64], Medicaid for Currie and Gruber (1996)[28] and Card and Shore-Sheppard (2004)[21]).

Moffitt (1983)[58] blamed stigma as the barrier of take-up and found that stigma cost does not vary with the size of benefit. Even with the difficulty of distinguishing each type of factor from the other type, there have been three groups that the literature has tried to find responsible for affecting take-up. One is the benefit itself. As the expected amount or duration increase, the take-up also increases (McCall (1995)[54] , Anderson and Meyer (1997)[2]). The second one is transaction cost which is related to socio-economic characteristics or psychological cost. (Storer et al.(1995)[70],

Daponte et al.(1999)[29], Kayser et al.(2000)[49]) The last one is about information. When potential beneficiaries feel uncertain about their eligibility or have fewer sources to make them aware of the program, it has a negative effect on participation. Halpern and Hausman (1986)[47] examine the effect of uncertainty of acceptance on take-up rate. Dorsett and Heady (1991) found that the households participating in other social welfare programs could be alerted to the existence of other social assistance programs and are more likely to become beneficiaries of CCTs.

This random utility model does not undergo technical improvement until Duclos (1995)[32] points out the importance of possible errors in the classification of eligibility from survey data. He proposes a bivariate probability model which accounts for this possible error. Duclos (1997)[33] provides a specific explanation for this method. Hernandez and Pudney (2003), however, point out technical errors in the likelihood function in Ducloss method.

In contrast to other social programs, take-up analyses for CCTs are rare since the program is provided for almost all households which are selected in advance by the agency. There are only two take-up analyses for CCTs program. Those are for Mexican urban areas, since those households have to apply to the program to be beneficiaries. Coady and Parker (2005)[23] use the same sample with analysis here but their interest is not in child labor. Taking advantage of the delicacy of data, they estimate a probability model for each step: program perception, application and acceptance. Angelucci and Attanasio (2009)[4] (henceforth AA) question the low participation in this area and conclude that low expected benefit and information are possible causes. They investigate the effect of children on participation by age and status. Their results show that additional attending children increase the probability and working children decrease the probability. But it's hard to conclude that child labor itself has negative effect on participation based on their result since their result compounds the effect of the existence of a

child.

Since most means tested programs are provided conditional on income, the endogeneity of labor supply is a concern for the take-up analysis. Several studies account for the endogenous labor supply, but that is not the issue here, since the data set has acquired the income which is not adjusted for participation.

The other related strand of literature is about the cause of child labor. By investigating the cause of child labor, we can see how these characteristics could be represented by child labor. Several papers investigate factors determining child labor. Most of them attribute child labor to different levels of income or credit constraints (Basu and Van (1998)[9], Baland and Robinson (2000)[7], Barham et al. (1995)[8], Kruger et al. (2007)[52]). Those assume an altruistic view point; however, the conditionality imposed by CCTs raises doubts about this view. Some papers (Dumas (2007)[34] and Bhalotra and Heady (2003)[13]) conclude that the main cause of child labor is not poverty but an incomplete labor market. Ray (2000)[65] attributes child labor community infrastructure rather than income even though his result may suffer from endogeneity. From these results, child labor is not simply caused by poverty.

3.3 CCTs in Mexico and Data

This analysis uses the survey data of urban areas in Mexico in 2002 (Encelurb 2002). This survey is conducted right after the application process is finished to provide a chance to evaluate the program. The data includes various socioeconomic characteristics of households and individuals. The conditional cash transfers program called Oportunidades (opportunities) was originally launched in 1997 in rural areas. In 2002, they expanded the program to

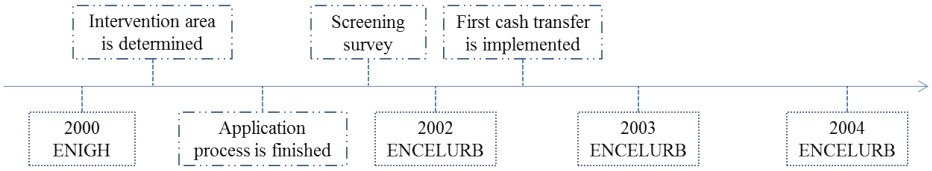


Fig. 3.1: The schedule of survey

Note: This figure depicts the timing of survey "2002 ENCELURB" from which the sample used comes from.

urban areas, and the survey has been done to evaluate this program. This survey can be seen as the part of a three-survey series to construct panel data for evaluation of CCTs in urban areas. The timing of each survey is summarized in Figure 3.1.

It is worth mentioning that this analysis is about the effect of child labor, not about the effect of the program on child labor. To ensure this, the measurement of child labor should be exogenous. This is true in that the status of a child is asked before implementing the program. The only possibility of endogeneity is that households report falsely because they believe that their answer would affect their eligibility of program. But I assume this would not be that severe.[1]

The sample is constructed based on a screening survey also conducted after the application process is completed. This screening survey chooses the block proportional to the number of eligible households (based on a 2000 census, ENIGH: National Income and Expenditure of Households Survey) and surveys every household in the chosen block. The households in the intervention area are sampled by street block unit. Every street block with more than 50 eligible households is included. Other street blocks are included with the probability proportional to the number of eligible households. The

[1] If households that apply to the program actually under-report child labor, it does not weaken the results; rather, it strengthen the results in this analysis.

sample for Encelurb 2002 is constructed considering which households were applying and which were not applying. This means that the sample is a subset of that of previous screening survey. The reason why they consider the number of actual applicants among eligible households is to evaluate the effects of this program. So data here are draw using stratified sampling. At the first stage, the population was divided according to the number of eligible households in block. At second stage, the population was divided according to whether households applied or did not apply. The total number of households is 15,700, and 76,002 individuals are surveyed. The unit of analysis here is households, so every bit of individual data is converted into household units. Along with several socio-economic characteristics, households are also asked if they are informed of this program. The program is advertised to potential beneficiaries through mass media and local media such as posting and announcing. The households in the control area are also surveyed, as well as the intervention area where there are opportunities for participating in the CCTs program. With classification of intervention and control groups, the households are also divided into three groups by degree of poverty. This classification is based on the proxy-means score whose criterion as agents has been used to determine beneficiaries. The households in data consist as in the Table A.8.

CCTs in Mexico are different from other social program in which all positive benefits are deemed to be eligible because they have separate rules for eligibility (proxy means score) and potential benefit. Specifically, the household whose proxy-means score is higher than 0.69 is classified as poor. A proxy-means score of 0.69-0.12 is classified as quasi-poor, and non-poor is for less than 0.12. This proxy-means score is calculated based on several households characteristics (e.g., number of people, number of children, possession of car, refrigerator, paved floor etc). There are specific scores for each fac-

Tab. 3.1: Characteristics of applying and non-applying households

Variables	Applying	Non-applying	difference
Potential benefit	502.6	481.7	20.95 **
# of children	2.91	2.54	0.37 ***
Indicator of children 0-5	0.59	0.53	0.05 ***
Indicator of children 6-12	0.70	0.59	0.11 ***
Indicator of children 13-15	0.33	0.28	0.04 ***
Indicator of children 16-20	0.30	0.38	-0.08 ***
Adult income	2,964	4,086	-1,121.5 ***
Children income	454.0	541.8	-87.89 **
Working children	0.34	0.32	0.02
Indicator of child labor	0.24	0.24	0.00
# of observations	2,755	2,388	

Notes: For the sample used in Table 3.6 (5,143 households). * for t-test. A potential benefit is expected from cash transfers when households participate in the program.

tor. The specific table for this calculation is represented in Table 6 in Coady and Parker (2005)[23]. The interesting sample here is 10,829 households in the intervention zone which are given the opportunity to apply for a CCTs program. But actual observation used in each estimation is less than this, because any households which do not respond to corresponding questions are dropped. After trimming, 5,159 households remain in the results reported in Table 3.6. The dropping seems not to relate to the classification systematically. The data description is reported in Table A.10. The potential benefit is calculated by the rule described in Table A.9. The cash transfer consists of two parts: for schooling and health care services. Every two months, the cash transfer is implemented after checking the conditionality. If students do not meet the attendance condition (85% attendance), the transfer is excluded for that period, but do not exempt them from the program. CCTs-subsidized schooling has been available to qualified students for some time, but health care service are a recent addition to the CCTs program. It provides them some lectures and counseling. To meet the conditionality, the relevant family members have to attend public health lectures and talks regularly. If house-

Tab. 3.2: Characteristics of households by child labor

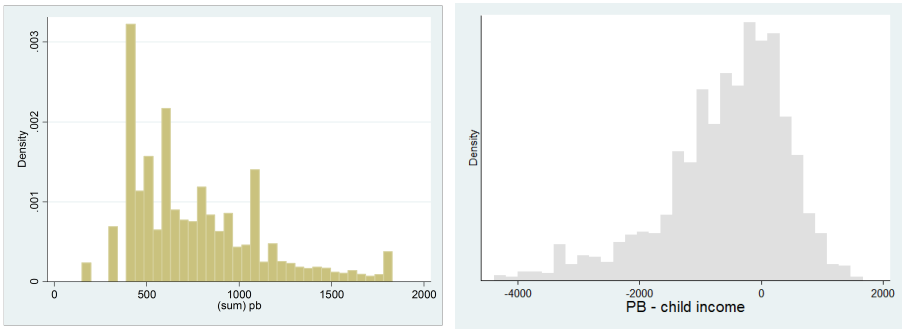
Variables	No child labor	Child labor	difference
# of children	2.53	3.42	-0.89
Adult income	3,580	3,181	265
Head sex (male=1)	0.83	0.72	0.11
Ratio of sons	0.23	0.44	-0.22
Indicator children 6-12	0.68	0.57	0.10
Indicator children 13-15	0.25	0.48	-0.23
Indicator children 16-20	0.19	0.82	-0.62
# of observations	3,917	1,226	

Notes: For sample used in Table 3.6 (5,143 households). All differences are significant at 1% level.

holds do not attend the health care service two times in succession, they are excluded from the program.
The potential benefit is based on schooling grades rather than age. So if a child dropped out school after finishing primary school, his expected benefit would be 290 regardless of his age. This calculated benefit is the maximum value that household can expect. Households doesn't need to make all their children attend school to receive cash. As long as one of their children meets the conditionality, they can expect cash transfers designed for that child.

Each individual reports income during different periods. Regarding this income data, it should be mentioned that there was no way to distinguish non-response and non-income (both are presented by non-response). So I assume that all non-responses are non-income. The household which has zero income is dropped and when it has been determined from other questions that the person is working, the households including that person are dropped.

Figure 3.2 shows how the amount of the cash transfer is designed. Panel (a) reports calculated potential benefit for households having children. The potential cash benefit is calculated as the amount that each household can



(a) Potential benefits

(b) Difference between PB and income from children

Fig. 3.2: Distribution of PB and PB - child income

expect monthly if they meet the conditionality. Panel (b) shows the distribution of difference between potential benefit and income earned by children for households having child labor. It reveals that the cash transfer only is not enough to compensate all child labor income. Among 1,644 households, only 671 (40.8%) households have positive potential benefits. But there seem to be no apparent differences in participation rates. The percentage of applying among households having positive and negative potential benefits are 61.4% and 57.3%.

Table 3.1 shows mean value of some variables according to whether households apply or not. For the applying households, income earned by children is lower than the households that are not applying. However, the number of working children doesn't seem to be different. And Table 3.2 shows how some variables are different according to child labor. The households having more sons or older children are more likely to have them work. The adult income is higher than that of households having no child labor. This may be indirect evidence that child labor is not just result of poverty but reflection of other unobserved characteristics. The applying ratio for households having child labor is 59% which is almost same as 57% for the other households.

3.4 Econometric Specification

3.4.1 Univariate Model

Contrary to other income support programs, CCTs are conditioned on consuming human capital goods, which are normally considered as normal goods. Therefore, it is desired to include the benefits from imposed conditionality with income benefit itself. For the main estimated equation, potential beneficiaries would compare the utility in two situations to determine whether or not to apply for a CCTs program. I assume two commodities, economy of numeraire and human capital goods, in single period. Then the condition for participation would be

$$U(y + PB, s = 1; x_1) - C(x_2) \geq U(y, s = 0; x_1) \tag{3.1}$$

where y is an adult income, PB is potential monetary benefit when participating, and s is the indicator for implementing the conditionality (attending school more than 85% and receiving health-care service). $C()$ is the cost corresponding to participation in the program[2]. x_1 and x_2 are household characteristic vectors which affect utility for numeraire, utility of schooling, health-care service and the take-up cost respectively. Since CCTs are binded with normal goods such as schooling and health service, the variable x_3, which is believed to be related to the utility from human capital goods (number of children who see a doctor or who fail to complete academic year), are added.

Participation can be characterized by the positive utility gain, $U(y + PB, s = 1; x_1) - C(x_2) - U(y, s = 0; x_1) \geq 0$. When this gain is linearly approximated by x_1, x_2, y and PB, participation rule would be

[2] For x_2 as child labor, this does not necessarily exclude the case in which the child is working part-time.

$$\ln(PB) + \ln(y) + x_1\beta_1 + x_2\beta_2 \geq \varepsilon \tag{3.2}$$

Or simply, every benefit is subsumed in exponential term and every cost in other exponential term, then participation occurs when

$U(y + e^{PB} - e^{x_2\beta_2}; x_1) \geq U(y; x_1)$

After taking U^{-1} , then the logarithm of this condition would be

$$PB - x_2\beta_2 \geq \varepsilon \tag{3.3}$$

Or, as Blundell et al. (1988)[16] did, assuming that utility function can be expressed as the linear combination of household characteristics.

$U(c, s; x_1) = \ln(c) + \alpha s + x_1\beta_1 + \varepsilon_1$

Where s is the indicator for attending school and α is the utility from schooling. Cost function is also a linear combination of x_2. Then equation (3.1) would be
$\ln(y + PB) + \alpha + x_1\beta_1 + \varepsilon_1 - x_2\beta_2 - \varepsilon_2 \geq \ln(y) + x_1\beta_1 + \varepsilon_3$

When heterogeneity for α according to household characteristics x_2 is allowed, then

$$\ln(y + PB) - \ln(y) - x_2\beta_2 \geq \varepsilon \tag{3.4}$$

Where $\varepsilon = -\varepsilon_1 + \varepsilon_2 + \varepsilon_3$

So all three specifications with a normal distribution of ε can be expressed as

$$Pr(\text{take-up}) = \phi(PB^*, x_1, x_2) \tag{3.5}$$

where ϕ is CDF for normal distribution and PB^* is the function of PB and y. All of them are the same except the form of income and potential benefit.

The effect as x_2 must be negative but the effect as x_1 is ambiguous, so the effect of child labor is an empirical question.

The endogeneity of schooling or income may not be severe in this data. Because this survey is conducted before the implementation of CCTs program and it could be safely assumed that potential beneficiaries didn't have a chance of adjusting schooling or labor supply.

3.4.2 Comparison with AA's Specification

AA investigate how the number of working children affects the participation in the program (even though this is not their paper's main topic). These analyses look identical in that both examine the effects of child labor, but there are several differences between AA's analysis and the analysis here. They add the number of children according to their status: working, attending school or doing neither. Their results show that working children has a negative effect on participation. This analysis has different specifications in three ways in terms of choice of variables. Firstly, a left-hand side variable is an indicator of applying which more reflects the beneficiaries' willingness and is free from the accuracy of administrative decisions. Secondly, the measurement of child labor is different. Since some children report positive child income while they report their status as attending school, the measurement of child labor is improved. And thirdly, this analysis tries to see the effect of child labor solely, while AA show the effect of number of working children

which compounds the effect of additional child itself. To see how these three things would change the results in AA's paper, Tables 3.5 and 3.6 show the estimates with applying each of them.

Before applying these changes, the replication of AA is done and presented in Table 3.4. The estimated equation and whole estimates are not reported in their paper, so it's not easy to reproduce exactly the same results, but I can notice that their specification is as follows.

$$y_i = X_{aj}\beta_1 + X_{bi}\beta_2 + \varepsilon_i \tag{3.6}$$

where y_i is the indicator of whether the household i is participating or not. When $y_i = 0$, it means household i did not apply the program or applied but were rejected (i.e. this indicator does not distinguish the primary non-take-up (does not claim) and secondary non-take-up(claim but are rejected)). The X_{aj} and X_{bi} represents the vector of characteristics of area j and household i.

X_{aj} includes

availability of primary, middle, and secondary schools

availability of health centers

dummies for area size

poverty incidence (as a second-order polynomial)

number of households.

And X_{bi} includes

household size dummies

number of children by age categories (0-5, 6-12, 13-15, and 16-20)

poverty index as a second-order polynomial

income (as a second-order polynomial)

savings and debt

death or illness of a nonresident family member
job or business loss for a resident family member
natural disaster
doctor visits in the previous 4 weeks for head, spouse, and children
household head's and spouse's presence (including multiple heads)
head's gender
literacy
head's education dummies
employment status in 2002
dummies for whether either head or spouse worked in 1999, 2000,and 2001
income of head and partner in 2001, 2000, 1999 [3]
dummies for welfare assistance in the previous 12 months
ownership of durable assets (car, truck, appliances, and home)
dwelling characteristics (floor, roof, walls, rooms, piping and bathroom)
food consumption
nonfood consumption

The first column in Table 3.4 contains the results when I include all these variables except X_{aj} (some coefficients for type of walls and ceiling, dummies for household size, head's education, possession of house, and receipt of other welfare assistance are estimated but not reported). The descriptions of explanatory variables are provided in Table 3.3. The estimated coefficients of working children and attending school is far from those in AA. Originally their results show that, as households have additional working children aged 13-15 and 16-20, the probability of participation is decreasing by 6.5%p and

[3] With total income, controlling income earned by head and partner is the same as controlling the income earned by other members including children. But this is not the same with child income. The average number of members is 4.9 while the average number of children is 1.9.

Tab. 3.3: Description of explanatory variables

Variables	Description
Measurement I : child activity	
Neither	Number of children neither working nor attending school
School	Number of children attending school (exclusive to work)
Working	Number of children working (exclusive to schooling)
Measurement II : child activity	
Neither	Number of children neither working nor attending school
School	Number of children *only* attending school
Working	Number of children *only* working
Both	Number of children attending school and working
Covariates	
Poverty score	Means-testing score. The higher means poorer.
Income	Household income
Death (=1)	Indicator of death or illness among households member
Unemployment (=1)	Indicator of unemployment in last year.
Loss (=1)	Indicator of loss of business in last year.
Disaster (=1)	Indicator of natural disaster in last year.
Doctor_h (=1)	Indicator of visiting doctor for head
Doctor_s (=1)	Indicator of visiting doctor for spouse
Doctor_c (=1)	Indicator of visiting doctor for children
Head (=1)	Indicator of existence of head in the households.
Spouse (=1)	Indicator of existence of spouse in the households.
Head sex (1= male)	Indicator of sex, 0=female
Literate (=1)	Indicator of household head's literacy
Employee (=1)	Indicator of household head is employee
Employer (=1)	Indicator of household head is employer
Wk_head (=1)	Indicator of working household head in corresponding year
Wk_spouse (=1)	Indicator of working spouse in corresponding year
Incomey	Household income in corresponding year
Car (=1)	Indicator of household which has vehicle
Refrigerator (=1)	Indicator of household which has refrigerator
Floor (=1)	Indicator of household whose floor is not paved
Room	Number of rooms
C_food	Consumption of food
C_nonfood	Consumption of nonfood
Dum	Indicator of households with corresponding aged children
Child	Number of corresponding aged children

Tab. 3.4: Replication of AA's results

	(1) Participation		(2) Participation		(3) Participation	
Neither0-5	-0.0115	(0.444)	-0.000810	(0.949)	0.00490	(0.663)
Neither6-12	0.0213	(0.640)	-0.00420	(0.907)	0.0152	(0.647)
Neither13-15	0.00393	(0.913)	0.0121	(0.732)	0.0114	(0.747)
Neither16-20	-0.0379*	(0.081)	-0.0320*	(0.053)	-0.0351**	(0.026)
School0-5	0.0208	(0.431)	0.00138	(0.943)	0.0153	(0.441)
School6-12	0.00824	(0.398)	0.0144*	(0.078)	0.0275***	(0.000)
School13-15	0.0123	(0.361)	0.0335***	(0.005)	0.0352***	(0.003)
School16-20	0.0178	(0.553)	0.0189	(0.333)	-0.00532	(0.783)
Working13-15	**-0.0237**	(0.508)	**-0.0433**	(0.141)	**-0.0240**	(0.397)
Working16-20	**-0.0129**	(0.494)	**-0.0272***	(0.070)	**-0.0367*****	(0.009)
Poverty score	0.200***	(0.000)	0.172***	(0.000)	0.114***	(0.000)
Poverty score^2	-0.00385	(0.533)	-0.0107*	(0.065)	-0.00668	(0.314)
Income	-0.00000252	(0.273)	-0.00000154	(0.334)	-0.000000166	(0.921)
Income^2	1.11e-11	(0.123)	5.46e-12	(0.325)	7.38e-13	(0.896)
Saving	0.00411	(0.239)				
Loan	0.00239	(0.212)				
Death	0.0382**	(0.037)	0.0403**	(0.028)	0.0509***	(0.005)
Unemployment	0.0193	(0.435)	0.00954	(0.636)	0.0221	(0.248)
Loss	-0.105	(0.260)	-0.00898	(0.925)	-0.00270	(0.977)
Disaster	0.0192	(0.675)	0.0210	(0.585)	0.0508*	(0.081)
Doctor_h	0.0407	(0.150)				
Doctor_s	-0.00952	(0.633)				
Doctor_c	0.00829	(0.636)	0.0166	(0.262)	0.0186	(0.187)
Head	0.0816*	(0.057)	0.0893***	(0.007)	0.0711**	(0.016)
Spouse	-0.0227	(0.536)				
Head Sex	0.0154	(0.675)	-0.0324**	(0.039)	-0.0267	(0.101)
Literate	-0.0137	(0.750)	-0.0179	(0.598)	-0.0196	(0.507)
Employee	0.0334*	(0.066)				
Employer	0.00554	(0.942)				
Wk_head01	-0.0617	(0.126)				
Wk_head00	0.0324	(0.557)				
Wk_head99	-0.0472	(0.248)				
Wk_spouse01	-0.0223	(0.339)				
Wk_spouse00	0.0612*	(0.055)				
Wk_spouse99	-0.000997	(0.971)				
Incomey01	-0.00000248	(0.807)				
Incomey00	0.00000181	(0.866)				
Incomey99	-0.00000478*	(0.097)				
Car	-0.0481	(0.170)	-0.0573*	(0.069)	-0.0508*	(0.090)
Refriger	-0.0102	(0.694)	-0.0199	(0.391)	-0.0419**	(0.039)
TV	-0.0186	(0.425)	0.00545	(0.788)	-0.00412	(0.836)
Video	-0.0658***	(0.000)	-0.0558***	(0.001)	-0.0524***	(0.002)
Radio	-0.0270*	(0.062)	-0.0102	(0.468)	-0.0111	(0.338)
Washing	0.00633	(0.762)				
W_heater	-0.0672*	(0.054)	-0.0691**	(0.016)	-0.0596*	(0.051)
W_storer	0.0315	(0.307)	-0.0000165	(0.999)	0.00281	(0.908)
Floor	0.00460	(0.859)	0.0317	(0.133)	0.0508***	(0.007)
Room	-0.00360	(0.713)	-0.0136*	(0.090)	-0.0244***	(0.001)
C_food	-0.00000660	(0.521)	-0.0000102	(0.225)	-0.00000689	(0.450)
C_nonfood	-0.0000955***	(0.002)	-0.0000854***	(0.001)	-0.0000565***	(0.009)
_cons	-0.463	(0.188)	0.0418	(0.941)	1.814***	(0.002)
N	3765		5160		5160	
R^2	0.318		0.279		0.221	

Notes: p-values in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
(1) with all variables (2) closest replication (3) fixed-effect

4%p respectively.[4] And the additional children aged 13-15 and 16-20 attending school increase the probability by 3.6%p and 5.5%p, but the results in replication are not significant and different in magnitude.

However by looking at the sample size in their result, all variables mentioned above seem not to be included in their estimation, since their results say the sample size is 5,451. When all variables are included, the additional contraction is inevitable, so sample size is barely 3,800 as seen in the first column. Therefore in column (2), I've dropped some variables to get as results as close as possible with AA's. I've dropped the indicators of appliance (washing machine, stove and dryer), last three year's income, indicator of visit to doctor for househead and spouse, working status of head and spouse for last three years, savings and loan, indicator of employment status, indicator of spouse's presence and dummies for bathrooms. Most of these variables are related to the income or wealth of households and not all variables have a significant effect on participation in the program.

This result with dropping some variables in the column (2) is still different from AA's in the magnitudes of coefficient, but overall, the negative sign for number of working children and significantly positive sign for schooling is close to them. In column (3), for missing area level variables and controlling out the heterogeneity across the area, I adopt the fixed effect model. The interesting coefficients get larger and becomes more significant with exception of the coefficient of working children aged 13 to 15. In terms of the negative effect of working children and the positive effect of attending children, the replication in columns (2) and (3) shows results similar to AA's despite the smaller magnitudes of coefficients. What is different from their results is the negative impact of children aged 16 to 20 doing nothing. It is estimated as

[4] They only consider working children aged 13 to 20. It makes sense in that most working children are in that age group. In this paper, some working children aged 6 to 12 are additionally accounted for, but very few households with working children under 5 are dropped.

the negative effect as much as working children on participation.

With the result in column (3) in Table 3.4 which could be considered as

Tab. 3.5: Modification of replication with indicator of participation

	(1)		(2)		(3)	
	Participation		Participation		Participation	
Neither0-5	0.00490	(0.663)	0.0230*	(0.084)		
Neither6-12	0.0152	(0.647)	0.00785	(0.788)		
Neither13-15	0.0114	(0.747)	-0.0553*	(0.088)		
Neither16-20	-0.0351**	(0.026)	-0.0303*	(0.085)		
School0-5	0.0153	(0.441)	0.0415**	(0.040)	0.0185	(0.414)
School6-12	0.0275***	(0.000)	0.0487***	(0.000)	0.0408	(0.106)
School13-15	0.0352***	(0.003)	0.0544***	(0.000)	0.110***	(0.001)
School16-20	-0.00532	(0.783)	-0.0114	(0.564)	0.0189	(0.495)
Working6-12			0.0108	(0.877)	0.00293	(0.967)
Working13-15	-0.0240	(0.397)	-0.0265	(0.331)	0.0289	(0.475)
Working16-20	-0.0367***	(0.009)	-0.0262*	(0.059)	0.00415	(0.871)
Both6-12			0.0917***	(0.002)	0.0839**	(0.049)
Both13-15			0.0784**	(0.017)	0.134***	(0.004)
Both16-20			0.0538*	(0.064)	0.0841**	(0.024)
Child0-5					0.0230*	(0.084)
Child6_12					0.00785	(0.788)
Child13_15					-0.0553*	(0.088)
Child16_20					-0.0303*	(0.085)
_cons	1.419**	(0.016)	1.004*	(0.051)	-0.211	(0.683)
N	5160		5160		5160	
R^2	0.221		0.227		0.227	

Notes: p-values in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

(1) Using Measurement I. Same as the third column in Table 3.4 (2) Measurement II of child activity (3) Measurement II + numbers in age groups

the replication of AA's, an experiment is implemented to see how a different measurement of child labor and specification could affect AA's results. These results are reported in Table 3.5. It is worth noting that similar results are obtained when this is done with the other replication which is in column (2) in Table 3.4. The second column uses different measurements of children's

Tab. 3.6: Modification of replication with indicator of applying

	(1)		(2)		(4)	
	Applying		Applying		Applying	
Neither0-5	0.00807	(0.436)	0.00249	(0.848)		
Neither6-12	0.0521*	(0.097)	-0.0176	(0.530)		
Neither13-15	0.0606*	(0.092)	-0.0323	(0.330)		
Neither16-20	-0.0599***	(0.010)	-0.0401*	(0.089)		
School0-5	0.0114	(0.618)	0.00561	(0.820)	0.00312	(0.883)
School6-12	0.0277***	(0.002)	0.0240**	(0.045)	0.0416	(0.113)
School13-15	0.0446***	(0.002)	0.0421***	(0.010)	0.0743**	(0.027)
School16-20	-0.0134	(0.385)	-0.0301	(0.175)	0.0101	(0.743)
Working6-12			-0.0748	(0.258)	-0.0571	(0.440)
Working13-15	0.00712	(0.812)	0.00177	(0.950)	0.0341	(0.431)
Working16-20	-0.00817	(0.478)	-0.0184	(0.126)	0.0217	(0.412)
Both6-12			0.0502*	(0.062)	0.0678*	(0.069)
Both13-15			0.112***	(0.000)	0.144***	(0.000)
Both16-20			-0.00346	(0.887)	0.0367	(0.239)
Child0-5					0.00249	(0.848)
Child6_12					-0.0176	(0.530)
Child13_15					-0.0323	(0.330)
Child16_20					-0.0401*	(0.089)
_cons	-0.167	(0.513)	-0.206	(0.459)	0.816***	(0.002)
N	5143		5143		5143	
R^2	0.170		0.171		0.171	

Notes: p-values in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

All columns are the same as in Table 3.5 except dependent variable

activity. In the previous Table, the status of children is determined based on the question asking their status during the last week (called Measurement I which is believed to be used in AA). The answer is given exclusively so all children fall into one of these categories: schooling, working or neither. So the sum of children in each category is equal to the sum of children in households. But from the other questions, I can produce another measurement of child activity (called Measurement II). This measurement additionally considers the positively reported income while children report attending school, and there was a question asking if a child is currently attending school. This question seems to ask general status while the former one just asks the status during last week. By considering these two questions I can divide the children into four exclusive categories: doing nothing, schooling only, working only and doing both[5].

The results of estimation using these different measurements are reported in the column (2). It could be seen that the negative effect of working children and positive effect of children in school remain almost same, but the positive effect of children doing both is what was hidden in the first column. It is interesting to see that the coefficients of number of children doing both is greater than those of number of children only attending school. This implies the marginal effect of working on participation is positive. Also, the negatively estimated coefficients of 'Neither' show the possibility that marginal effect of working is not negative. Simple calculation using the estimates in column (2) reveals the marginal effect of children's activity. For example, the effect of attending school itself for children aged 6 to 12 can be obtained by subtracting 0.00785 from 0.0487. If estimation is done conditionally on the number of children and reference category is children doing neither, that will directly show the effect of children's activity compared to when children

[5] Among working children, about 29.4% also attend school. 10% of them work less than 10 hours and 20% work less than 20 hours (average weekly working hours for working children is 42.2 hours)

are doing neither. This is what I've reported in the third column.

Thus, the result in column (3) is straighter and allows me to see if the effect of children's activity is statistically significant though this result is virtually same as that in column (2). Because the reference category in column (3) is the child doing neither, the coefficients of each status are the same as the difference between the coefficients of corresponding status and those of 'Neither' in column (2). The estimated coefficients of the number of children show that additional 13 to 20 aged children doing neither reduce the probability of participation by 5.53%p to 3.03%p. This also could be confirmed in the second column. Overall, the results reveal that only working children make no difference in the probability of participation compare to the children doing neither. The coefficients of 'Working' in column (3), which shows the difference, are estimated positively but are not significant. This implies that the negative coefficients of number of working children in column (1) is not actually the result of working status. However, when the children only attending school are compared to students doing both, it shows that marginal effect of working is positive on the participation.

Exactly the same estimations are implemented with replacing the indicator of participation with the indicator of applying in Table 3.6. By comparing column (1) in Tables 3.5 and 3.6, it is possible to see how the replication of AA is changed when the only left-hand variable is changed. It reveals that there is a possibility that the negative sign of number of working children in AA is due to the fact that household having working children with more income is more likely to be screened out in the office. As in Table 3.5, the significantly negative effect of working activity is not founded. The effect of children doing both is estimated as positive and this effect is larger than that of children only attending school.

The positive effect of children doing both could not be explained by opportunity cost alone. The likely explanation could be the subsistence hypothesis:

children is working only if their income falls below a tolerable level. Compared to households where children are attending school but not working, the households having working children have higher marginal utility from cash transfer, so they are more likely to participate in the program. The households with full-time working children may have a higher marginal utility, but they will not be able to attend school anyway, even after receiving a cash transfer which would be less than a full-time worker's earning.

3.5 Results

The previous section investigates the effect of the number of working children based on AA's specification. It is shown that the number of working children is actually associated with a higher chance of applying to the program. This section tries to estimate again with slightly different specification and different measurements of child labor, and child income. This could also be seen as the robustness check of the previous result. As equation (3.5) shows, the probability of participation in the program could depend on the characteristics of children (x_1) through different gains in utility and the potential amount of cash transfers. Thus, these variables are considered additionally. It is not clear if the reason that households with child labor are more likely to participate is that child labor is the reflection of poverty. However, if this positive relationship is confirmed even after controlling other children's characteristics and potential benefit, it is more compelling to argue that households with high marginal utility are revealed with child labor.

Also, child income is tried instead of the number of working children. In the sense that working children represent the characteristic of households that suffer from high marginal utility of additional income, the better measurement will be the incomes from child labor. The previous specification

suggests that child income could be x_2 (the form depends on the form of $C()$) and any other measurement of child labor could be considered as x_1, but it's difficult to measure these effects separately with a strong relationship between income earned by children and the measurement of child labor. So each of them is tried alternatively one by one.

As in the previous section, using a linear probability specification, equation (3.5) is estimated. The formal estimated equation is

$$app_i = PB^* + X\beta + v_m + \varepsilon_i \tag{3.7}$$

Where i represents household, m represents locality (the unit broader than block) and X is a vector of households' characteristics, x_1 and x_2. v_m is the unobserved area-specific effect which is controlled through fixed-effect model. PB^* is the transformation of potential benefit (cash transfers) that households can expect by participating in the program and meeting the conditionality. The form of PB^* depends on the utility form as seen in equation (3.2), (3.3) and (3.4). Two forms, $\ln(y + PB) - \ln(y)$ and $\ln(PB)$, were considered, but only the latter one is reported. The dependent variable app_i is the indicator of applying to the program. All but PB^* and some children's characteristics are same as in column (4) in Table 3.6. The coefficient of interest here is the coefficient of child labor. The number of children by status is tried first and child income is tried subsequently. Some households are additionally dropped when their applying indications are not reliable. The indicators of participation are based on administrative data so they are accurate and reliable. But in case of indicators of applying which are solely based on the answer of survey, some households' answer must be incorrect. So the households which answer that they didn't apply while they are actually participated in the program are dropped.

Before explaining these results, Table 3.7 reports the results when child

Tab. 3.7: The effect of child income on application

	(1) Applying		(2) Applying		(3) Applying	
School0-5	0.00892	(0.694)	0.00848	(0.708)	0.00833	(0.714)
School6-12	0.0169	(0.179)	0.0163	(0.189)	0.0165	(0.187)
School13-15	0.0236	(0.280)	0.0247	(0.254)	0.0241	(0.268)
School16-20	0.0216	(0.202)	0.0233	(0.192)	0.0214	(0.228)
income			-0.00000278	(0.172)		
income2^2			7.27e-12	(0.285)		
log(income)	-0.00334	(0.530)				
2nd quartile					-0.0284*	(0.063)
3rd quartile					-0.0357*	(0.092)
4th quartile					-0.0723***	(0.000)
Child's income			0.0000182	(0.131)		
Child's income ^{2}			-1.63e-09	(0.137)		
log(Child's income)	0.00300	(0.349)				
1st quartile_c					-0.0129	(0.764)
2nd quartile_c					0.0420*	(0.065)
3rd quartile_c					0.0350	(0.263)
4th quartile_c					0.0214	(0.527)
N	5143		5143		5143	
R^2	0.169		0.169		0.171	

Notes: Results with children's income for the sample used in Table 3.6.
p-values in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.
quartile_c is calculated only for children's positive income.

income is used with the same sample and specification as in Table 3.6. The only exception is that total income is converted to income excluding income earned by children to see the effect of children's income. To keep consistency, every covariates remain same, thus the sample used are same. These are estimated conditional on number of children as in column (4) in Table 3.6. To account for the different form of income, the logarithm, polynomial forms and indicators of quartile are tried. The results show that, as children earn more income, the probability of applying to the program is also increased although it is not significant at the 10% level. When logarithm of income and polynomial form are used, the coefficients are not estimated significantly,

but when quartiles are used, they are estimated significantly. For quartiles, the positive effect of children's income is dominant for the second quartile (lowest 25% 50%). The interpretation for this pattern is provided in following results which show similar pattern with little different specification.

Returning to equation (3.7), by including additional variables, sample size is reduced to 3,463 from 5,143. Table 3.8 reports the results when numbers of children by status are used. It may be desirable to exclude the households which didn't know the program, but they are included in the estimation as in the previous section. Non-participants are more likely to say they didn't, even if they actually know the program. Also, if the gain from participation is sufficiently large, there is no reason that they wouldn't try to know the program.

The coefficient of the log of PB is estimated positively as expected. The wealth would be the main factor determining take-up and it is also related to child labor. To control for this effect, the large set of households characteristics are essential. As in the previous result, indicators of dwelling conditions and appliances show that the poorer households are more likely to apply to the program. Negative sign on income is a common result in the take-up estimation literature. It may reflect the fact that high income households have more stigma cost.

The children characteristics which are believed to affect the utility of schooling is additionally included. These include the number of smokers, sons, illiterates, married, those who ever fail to complete the year and who ever quit school, those who are not direct descendants of household head, and disability. The result shows that the child characteristics are not significant factors except the number of smokers and the number of children experiencing failure. When children follow their parent well, they are not likely to smoke, so this is a reasonable proxy for a control problem. The positive sign of smokers among children implies that parents have incentive to

Tab. 3.8: Regression of applying

	(1) Applying	
log(Potential Benefit)	0.0296*	(0.078)
School0-5	0.00952	(0.677)
School6-12	0.0365	(0.336)
School13-15	0.103***	(0.009)
School16-20	0.0177	(0.568)
Both6-12	0.0695	(0.126)
Both13-15	0.158***	(0.001)
Both16-20	0.0538	(0.187)
Working6-12	-0.118	(0.367)
Working13-15	0.0382	(0.462)
Working16-20	0.0246	(0.439)
Indicator of children visiting doctor	0.0504***	(0.002)
Car	-0.0824**	(0.039)
Literate	-0.0255	(0.372)
Refrigerator	-0.0556***	(0.006)
TV	0.00786	(0.686)
Video	-0.0827***	(0.003)
Radio	-0.00805	(0.589)
Poverty Score	0.0357	(0.228)
Poverty Score ^{2}	0.00275	(0.722)
Income2	-0.00000455*	(0.082)
Income2 ^{2}	9.66e-12	(0.679)
Head	0.0636	(0.133)
Death	0.0389*	(0.093)
Unemployment	0.0574***	(0.003)
Loss	-0.117	(0.275)
Disaster	-0.0280	(0.521)
Head Sex	-0.0490**	(0.027)
Floor	0.0510**	(0.020)
Room	-0.0201*	(0.059)
Food consumption	-0.0000158*	(0.084)
Non-food consumption	-0.0000654**	(0.016)
Child0_5	0.0129	(0.235)
Child6_12	-0.0125	(0.737)
Child13_15	-0.0846**	(0.035)
Child16_20	-0.0788***	(0.005)
Children characteristics		
Number of smokers among children	0.0477***	(0.010)
Number of sons among children	0.00696	(0.464)
Number of illiterates among children	-0.000515	(0.989)
Number of married children	0.0156	(0.613)
Number of children who fail	0.0361***	(0.000)
Number of children who have quit school	-0.00442	(0.740)
Number of children who are not direct descendants	-0.0120	(0.472)
Number of children who are disabled	-0.0245	(0.320)
_cons	0.454**	(0.045)
N	3463	
R^2	0.233	

Notes: Estimation of equation (3.7). Main differences from Table 3.6 includes additional children's characteristics and potential benefits.
p-values in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Tab. 3.9: The effect of child income on application

	(1) Applying		(2) Applying		(3) Applying	
log(PB)	0.0280	(0.102)	0.0280	(0.102)	0.0277	(0.108)
School0-5	0.0128	(0.585)	0.0136	(0.556)	0.0129	(0.576)
School6-12	-0.00583	(0.684)	-0.00802	(0.555)	-0.00619	(0.668)
School13-15	0.0512**	(0.031)	0.0523**	(0.022)	0.0511**	(0.031)
School16-20	0.0279	(0.205)	0.0306	(0.189)	0.0281	(0.233)
income			-0.00000422	(0.113)		
income2^2			6.33e-12	(0.790)		
log(income)	-0.00166	(0.772)				
2nd quartile					-0.0268	(0.226)
3rd quartile					-0.0381	(0.113)
4th quartile					-0.0694***	(0.005)
Child's income			0.0000215	(0.143)		
Child's income ^{2}			-2.32e-09*	(0.077)		
log(Child's income)	0.00344	(0.300)				
1st quartile_c					-0.00346	(0.933)
2nd quartile_c					0.0552*	(0.054)
3rd quartile_c					0.0261	(0.441)
4th quartile_c					0.0203	(0.619)
N	3463		3463		3463	
R^2	0.228		0.229		0.230	

Notes: Results with children's income for the sample used in Table 3.8.
p-values in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.
quartile_c is calculated only for children's positive income.

utilize conditionality to control their children. In regarding this, it is worth mentioning Bursztyn and Coffman (2009)[20]'s results. They have valued conditionality by measuring willingness to pay to convert conditional transfer to unconditional transfer. They argue that it is hard to say parents have low preference for schooling. Rather they have difficulty ensuring their children will attend school. In this respect, to provide children more incentive to attend school and device to supervise, household decision makers actually prefer conditional transfers. The positive sign of 'failure' also could be interpreted similarly.

The coefficients of the number of children according to their status are

estimated similarly with previous results. When a child is both working and attending school, that household is more likely to apply to the program. This positive effect is larger than that of child who only attends school. This result is consistent with the possibility that households with child labor suffer from high marginal utility from income.

Table 3.9 presents results when children's income is used instead of the number of children by activity. The logarithm of income is tried in the column (1) and polynomial form is tired in the column (2). In both columns, the positive effect of children's income on applying to the program is confirmed although it's not significant. When quartiles are tried in column (3), the positive effect is confirmed significantly for the second quartile. As polynomial form and quartiles show, the positive effect of children's income is pronounced up to a certain point. These results could be interpreted based on the subsistence hypothesis (child labor occurs only when income is below certain level). For a moderate level, the households could have additional gain from stopping child labor and attending school by receiving cash transfers. For households with higher income earned by children, however, marginal utility is still too high even after receiving cash transfers to attend school, so they have less incentive to participate in the program. This is also consistent with the results reported in Table 3.6. They have shown that only working children have no significant effect while children doing both have a positive effect on participation.

Contrary to rural areas, in urban areas, a child over 17 is also eligible for cash transfers, so children under 21 are considered in this result, but it is normal to work and it is less likely to come back to school for children aged over 17. For this reason, estimations are tried with children under 17, and the results remain the same.

3.6 Concluding Remarks

Expected net benefit is a main factor in determining take-up of social assistance programs. Then the foregone income to meet the conditionality still has negative effects on take-up in CCTs program? The answer provided in this analysis is 'No'. This is a somewhat striking finding since the large opportunity cost of meeting conditionality in urban Mexico have been attributed to low participation rate, but what we have forgotten is the conditionality in CCTs could result in not only cost but also additional utility. If the utility from meeting conditionality outweighs the foregone cost and child labor is related to the household characteristics valuing conditionality more, the child labor could have a positive effect on participation.

The implications of the results are threefold. Firstly, the large job opportunities for children in urban area may not be the main cause of low participation in CCTs as earlier papers stated. There was a difference in application process between rural area and urban area. Because the potential beneficiaries in urban area should apply to the program to check their eligibility, the uncertainty might be the main reason for low participation rate in urban area. Secondly, the participation rate could be increased if the amount of cash transfers are reallocated between part-time and full-time working children. Part-time working children have more incentive to participate in the program, thus, the amount of cash does not need to be equal to attract them. Thirdly, and more importantly, this finding doubts the validity of conditionality in CCTs (not about increasing the attendance rates but about welfare of beneficiaries compared to non-conditional transfers). Conditionlity is introduced since it is believed that child labor as a substitute for schooling occurs for some reasons other than poverty. This finding provides indirect evidence supporting that child labor is the result of poverty while CCTs considers child labor as the result of some the other factors. If

children go to work for their selfish parents, the effect of working children or income from children should have negative effect on participation while the opposite is found in this analysis. Of course, the finding here does not necessarily mean that a positive relationship between child labor and the participation of the program is the causation. However, this analysis provides evidence supporting that households having child labor are more likely to participate; therefore, it opens the possibility that child labor is mainly a result of poverty. Which characteristics related to child labor cause this relationship are questions to be investigated further.

APPENDIX

.1 Appendix

Tab. A.1: Correlation

	Social	Economic	Conservative	Liberal	ST1	ST2	ST3	ST4	ST5
Social	1								
Economic	-0.8542	1							
Conservative	-0.0801	0.1025	1						
Liberal	0.1216	-0.1346	-0.6628	1					
ST1	0.1409	-0.1559	0.0222	0.056	1				
ST2	-0.3139	0.2892	0.2287	-0.1607	-0.2217	1			
ST3	0.0824	-0.0627	0.1122	-0.0765	-0.2421	-0.1567	1		
ST4	-0.0351	0.0581	0.2174	-0.3271	-0.3648	-0.2362	-0.2578	1	
ST5	0.0741	-0.0805	-0.5638	0.5132	-0.2866	-0.1855	-0.2025	-0.3053	1

Notes: For the observation in 97,99,03 and 07. ST1 - ST5 are indicators of each state.

Tab. A.2: Robustness I

	(1) LSDV Social(%)		(2) Bias-corrected LSDV Social(%)		(3) System-GMM Social(%)	
y_{t-1}	0.302***	(0.0373)	0.499***	(0.0419)	0.591***	(0.0614)
Elect1	-3.054*	(1.811)	3.441	(2.491)	0.711	(1.442)
Elect3	6.991***	(1.941)	2.060	(2.289)	-0.0605	(1.312)
Elect4	-1.803	(2.081)	-6.494***	(2.058)	-1.437	(1.535)
Conservative	-0.828	(1.897)	-0.816	(1.505)	-1.084	(1.740)
EPW	0.117***	(0.0413)	0.115**	(0.0500)	0.0392	(0.0409)
Elect1×Con	0.0936	(1.570)	-0.0205	(1.192)	-0.517	(1.452)
Elect3×Con	-0.269	(1.454)	0.102	(1.046)	0.740	(1.790)
Elect4×Con	0.506	(1.536)	1.094	(1.581)	2.137	(1.676)
Elect1×EPW	0.0107	(0.0484)	0.0152	(0.0486)	0.0917	(0.0598)
Elect3×EPW	-0.0126	(0.0325)	-0.0232	(0.0546)	-0.0430	(0.0386)
Elect4×EPW	-0.0468	(0.0361)	-0.0628	(0.0387)	-0.0791*	(0.0404)
EPW×Con	-0.146***	(0.0352)	-0.138***	(0.0528)	-0.0678	(0.0451)
Elect1×EPW×Con	0.0214	(0.0527)	0.0125	(0.0627)	-0.0819	(0.0719)
Elect3×EPW×Con	0.101**	(0.0393)	0.116**	(0.0579)	0.151***	(0.0555)
Elect4×EPW×Con	0.113**	(0.0434)	0.120**	(0.0513)	0.123**	(0.0595)
Population	-0.0435***	(0.0153)	-0.0554***	(0.0212)	0.00402*	(0.00212)
Farm	0.135	(0.160)	0.126	(0.196)	0.0480	(0.0474)
Old	-1.510**	(0.718)	-1.404**	(0.715)	-0.140	(0.199)
Young	1.081	(0.671)	1.030	(0.666)	0.439	(0.338)
_cons	42.60**	(21.45)			15.73	(9.645)
N	755		755		755	
R^2	0.279					

Notes: (1) Least squared dummy variables (2)Bias-corrected LSDV by Kiviet (1995)[50] (3)System GMM. Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

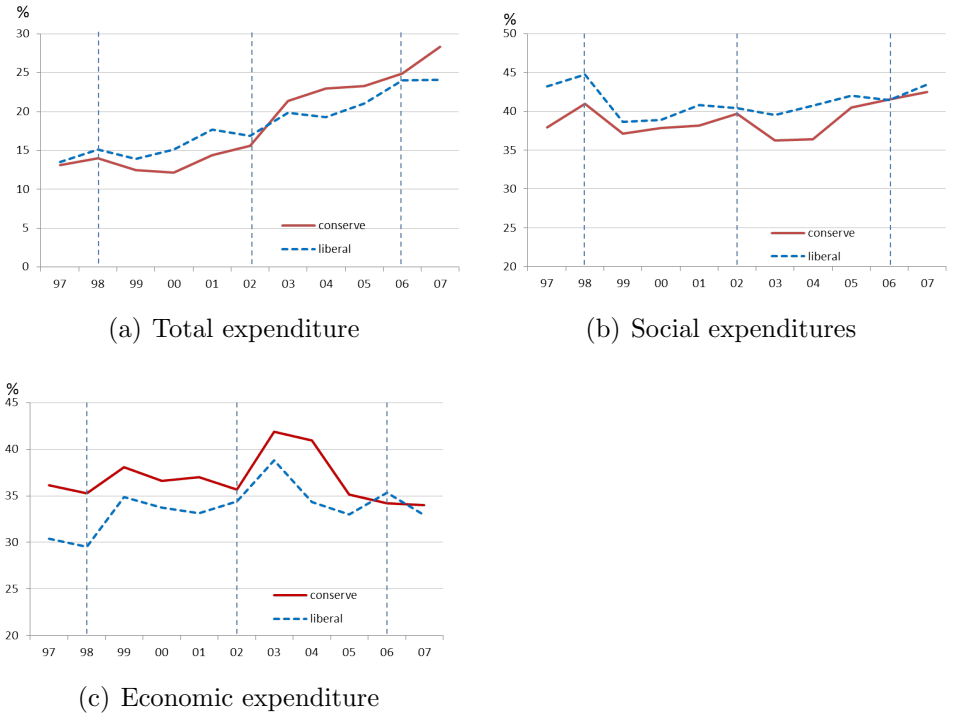
Tab. A.3: Robustness check II

	Sample is limited				% of total spending			
	(1) Social(%)		(2) Social(%)		(3) Social(%)		(4) Economic(%)	
y_{t-1}			0.660***	(0.0951)	0.549***	(0.0764)	0.342***	(0.0753)
y_{t-2}							-0.171***	(0.0553)
Elect1	5.788***	(2.113)	7.547***	(2.902)	4.494***	(1.410)	-3.317**	(1.551)
Elect3	-6.570	(6.402)	4.641*	(2.682)	1.587	(1.103)	0.502	(1.306)
Elect4	0.909	(5.714)	9.277***	(3.280)	1.949	(1.340)	0.701	(1.430)
Conservative	2.836	(2.847)	1.689	(2.538)	-0.332	(1.427)	2.781	(2.303)
EPW	0.0669	(0.0670)	0.0435	(0.0440)	0.0794**	(0.0345)	-0.0608	(0.0523)
Elect1×Con	-0.783	(1.759)	-3.843	(2.790)	-0.694	(1.309)	-0.820	(1.705)
Elect3×Con	-1.059	(2.121)	-1.888	(2.683)	0.382	(1.276)	-2.289	(1.607)
Elect4×Con	-4.019	(2.477)	-5.903*	(3.583)	1.174	(1.347)	-4.340***	(1.598)
Elect1×EPW	0.00706	(0.0378)	0.0910	(0.0972)	0.00518	(0.0540)	-0.0462	(0.0343)
Elect3×EPW	0.00981	(0.0417)	-0.00825	(0.0511)	-0.0571**	(0.0266)	0.0106	(0.0384)
Elect4×EPW	-0.0386	(0.0374)	-0.00288	(0.0393)	-0.0543	(0.0346)	0.0553	(0.0433)
EPW×Con	-0.102**	(0.0439)	-0.0394	(0.0441)	-0.110***	(0.0308)	0.0952**	(0.0456)
Elect1×EPW×Con	0.00803	(0.0419)	-0.145	(0.105)	0.0111	(0.0530)	0.0248	(0.0478)
Elect3×EPW×Con	0.0455	(0.0506)	0.0566	(0.0714)	0.128***	(0.0377)	-0.0806	(0.0517)
Elect4×EPW×Con	0.0808	(0.0551)	-0.00307	(0.0655)	0.0777*	(0.0400)	-0.0826	(0.0526)
Population	-0.00839	(0.0312)	-0.0649**	(0.0270)	-0.0515***	(0.0137)	0.0373	(0.0229)
Farm	-0.174	(0.297)	0.135	(0.273)	0.183*	(0.110)	-0.0625	(0.152)
Old	-0.342	(1.122)	-2.093*	(1.233)	-1.806***	(0.561)	1.567**	(0.752)
Young	0.558	(0.986)	1.485*	(0.787)	0.748	(0.539)	-1.642**	(0.728)
_cons	47.31*	(27.14)						
N	443		329		628		501	
R^2	0.247							

Notes: (1)(2)Drop when challenger is independent (3)(4)Ratio to total expenditure as dependent variable
Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Tab. A.4: Countries in the sample with GDP per capita in 2010

Country	GDP ($)
Japan	42,831
New Zealand	29,352
Czech Republic	18,254
Slovak Republic	16,071
Estonia	14,341
Croatia	13,774
Hungary	12,863
Chile	12,431
Uruguay	11,633
Lithuania	11,045
Latvia	10,723
Brazil	10,710
Russian Federation	10,440
Turkey	10,094
Mexico	9,133
Kazakhstan	9,132
Argentina	9,124
Costa Rica	7,691
Panama	7,589
Romania	7,539
Bulgaria	6,333
Belarus	5,765
Jamaica	5,275
Thailand	4,608
Macedonia, FYR	4,461
China	4,428
Albania	3,677
El Salvador	3,426
Ukraine	3,007
Georgia	2,621
Sri Lanka	2,375
Philippines	2,140
Bolivia	1,979
Moldova	1,631
India	1,410
Papua New Guinea	1,382
Tajikistan	820
Nepal	525



(a) Total expenditure

(b) Social expenditures

(c) Economic expenditure

Fig. A.1: Trend of expenditure

Notes: Dotted lines indicate election years. Percent of total expenditure for (a) and (b). Per capita value for (c).

Tab. A.5: Correlation

	CL	Durable	Median^a	Median^b	GINI	Left
CL	1.0000					
Durable	0.0988	1.0000				
Median^a	-0.0318	-0.0870	1.0000			
Median^b	-0.0058	-0.1452	0.9587	1.0000		
GINI	0.0435	0.1250	-0.9798	-0.9796	1.0000	
Left	0.0433	0.0970	0.0794	0.1453	-0.1148	1.0000

Tab. A.6: Results using Gini index

Dependent: In-kind	(1)	(2)	(3)
CL		-0.0998**	-0.165***
		(0.010)	(0.006)
Gini		-0.00883	-0.0195***
		(0.117)	(0.003)
Gini×CL		0.00233**	0.00395***
		(0.022)	(0.004)
Left	0.0242		0.0205
	(0.141)		(0.396)
Left×Inflation	-0.0969		-0.131
	(0.452)		(0.189)
Inflation	-0.00796		0.0343
	(0.869)		(0.454)
GDP per capita	-1.954	-3.748	0.291
	(0.298)	(0.456)	(0.962)
Population density	-3.003***	-1.664**	-3.883***
	(0.000)	(0.029)	(0.000)
Transfers	0.763***	-0.629	-0.369
	(0.010)	(0.384)	(0.479)
Openness	-0.0651**	-0.0216	-0.0465
	(0.030)	(0.716)	(0.186)
Unemployment	-0.00685***	-0.000167	-0.00315
	(0.007)	(0.960)	(0.261)
_cons	0.970***	1.069***	1.671***
	(0.000)	(0.000)	(0.000)
N	336	240	160
R^2	0.289	0.251	0.505

Note: p-values in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

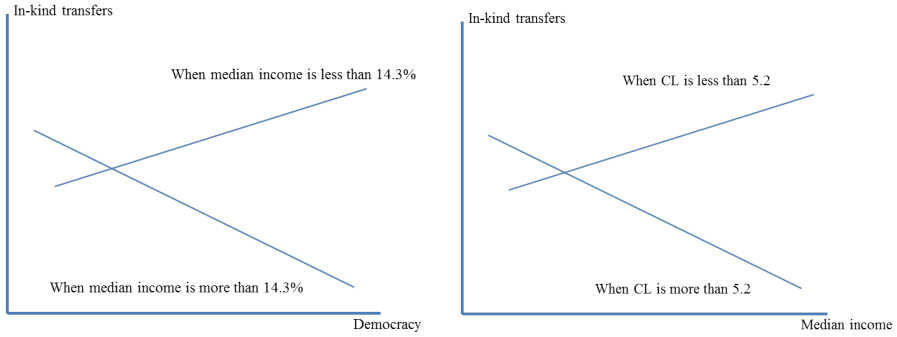
Tab. A.7: The effect of democracy on in-kind transfers

	Using Median^a		Using Median^b	
Dependent: In-kind	(1)	(2)	(3)	(4)
CL	0.114		0.263**	
	(0.112)		(0.010)	
Durable		0.185**		0.309**
		(0.012)		(0.030)
Median^a	0.0281	0.0189		
	(0.215)	(0.163)		
Median^b			1.696**	0.825*
			(0.026)	(0.059)
Median^a×CL	-0.00826*			
	(0.062)			
Median^b×CL			-0.385***	
			(0.005)	
Median^a×Durable		-0.0110**		
		(0.026)		
Median^b×Durable				-0.412**
				(0.047)
GDP per capita	-4.054	-5.348	-3.025	-4.536
	(0.422)	(0.301)	(0.544)	(0.392)
Population density	-1.721**	-1.601**	-1.712**	-1.548*
	(0.029)	(0.041)	(0.026)	(0.055)
Transfers	-0.610	-0.813	-0.693	-0.768
	(0.406)	(0.252)	(0.330)	(0.253)
Openness	-0.0250	0.0248	-0.0215	0.0355
	(0.680)	(0.656)	(0.715)	(0.547)
Unemployment	-0.0000660	-0.00147	0.000282	-0.00161
	(0.984)	(0.634)	(0.932)	(0.596)
_cons	0.326	0.388*	-0.475	0.0706
	(0.393)	(0.080)	(0.400)	(0.824)
N	240	240	240	240
R^2	0.239	0.246	0.262	0.252

Notes: p-values in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Median^b is the ratio of income share of the 3rd quintile to the 4th quintile. Median^b is the ratio of income share of the 3rd quintile to the 4th quintile.

Tab. A.8: Sample size by group

Zone	Poor	Quasi poor	Non poor	Total
Intervention	6,311	2,245	2,273	10,829
Control	3,634	945	292	4,871



(a) Democracy (b) Median income

Fig. A.2: The effect of median income and democracy on in-kind transfers
Notes: Based on the result in column (3) in Table 2.3.

Tab. A.9: Monthly transfers per children by grade

	Boys	Girls
Primary school		
Grade 3	100	100
Grade 4	115	115
Grade 5	150	150
Grade 6	200	200
Middle school		
Grade 7	290	310
Grade 8	310	340
Grade 9	325	375
High school		
Grade 10	490	565
Grade 11	525	600
Grade 12	555	635

Notes: The cap on the amount is 1,680 if children attend high school. Otherwise, 915. This table is copied from Coady and Parker (2005)[23]

Tab. A.10: Descriptive statistics

Variables	Mean	SD
Participation	0.48	0.50
Applying	0.54	0.50
Measurement I : child activity		
Neither0-5	0.68	0.80
Neither6-12	0.02	0.18
Neither13-15	0.02	0.17
Neither16-20	0.11	0.33
School0-5	0.09	0.29
School6-12	0.94	1.01
School13-15	0.27	0.53
School16-20	0.13	0.39
Working13-15	0.04	0.20
Working16-20	0.18	0.46
Measurement II : child activity		
School0-5	0.11	0.32
School6-12	1.03	1.02
School13-15	0.27	0.53
School16-20	0.11	0.37
Both6-12	0.03	0.22
Both13-15	0.03	0.19
Both16-20	0.04	0.23
Working6-12	0.00	0.07
Working13-15	0.03	0.19
Working16-20	0.19	0.48
Potential benefit	493.00	370.61
Poverty score	0.83	0.96
Income	3982.60	8007.66
Saving	0.46	1.98
Loan	1.86	3.25
Death	0.13	0.34
Unemployment	0.17	0.37
Loss	0.01	0.08
Disaster	0.04	0.19
Indicator of children visiting doctor	0.30	0.46
Head	0.97	0.17
Spouse	0.81	0.40
Head sex	0.81	0.40
Literate	0.95	0.22
Car	0.06	0.24
Refriger	0.44	0.50
TV	0.86	0.34
Video	0.13	0.34
Radio	0.70	0.46
Stove	0.85	0.36
Washing	0.17	0.38
Dryer	0.01	0.09
Water heater	0.05	0.22
Water storer	0.10	0.30
Floor	0.33	0.47
Room	1.71	1.02
Food consumption	358.82	606.46
Non-food consumption	300.88	310.29

Notes: For 5,143 households. Potential benefit and income are measured as monthly pesos.

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