THE EFFECT OF POLITICAL PARTIES ON THE DISTRIBUTION OF GOVERNMENT SUBSIDIES IN UKRAINE

by

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Abstract

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In my thesis I study the relationship between the distribution of power inside the Ukrainian Parliament, elections results and the allocation of government spending across administrative regions. The hypothesis is that the distribution of power and results of elections to the Parliament affect the allocation of government resources. Panel data estimation is employed in order to test the hypothesis. The result of the regression analysis suggests that only three parties affected grants distribution. The Communist Party appeared to have inverse effect, i.e. it tended to shrink allotment of funds to its dominated regions. The other two parties positively affected the distribution of subsidies to their dominated regions. These parties are the second and third largest in the Parliament and they consist on 80% of the deputies elected according to majority rule.

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Chapter 1

INTRODUCTION

Considerable attention in the literature has been paid to the issue of distributive politics and impact of a political system on the nation's economy. In my thesis I survey how the distribution of power between parties in the Ukrainian Parliament affects the allocation of resources (government expenditures) between regions. Political-economic regression is employed in order to test the hypothesis that political parties are strong organizations that have control over the government spending pie, i.e. the greater the power of a particular party the higher its influence on the allocation of budget funds. Several control variables are used to account for constituents' interests. The power index of a party is measured by the Shapley value.

Each political party, at least during election campaign, claims to defend the interests of a particular social group (Communists are supposed to stand for interests of workers), industry (Agricultural Party should promote the relevant industry). The deputies elected by location principle should do their best in order to bolster constituents of their region. However, in reality we may observe quite different situation. Political parties may cover their real intentions with slogans in order to be elected or to stay in the Parliament. Do the coalitions form in Ukrainian Parliament in order to bolster their constituents or with the aim of reaching their own goals? This question stresses the motivation of my thesis. Transition economy possesses one interesting feature. In making their choice among numerous political parties during elections people have no historical information, i.e. economically speaking – no reliable sample, about these parties. So, the only source of information is announced program and/or perceived past reputation. The latter reason may be one of possible explanations why the Communist Party is the biggest (112 members out of 450). Most of the old people, who are retired now and receive very small pension, are not happy with the current state of affairs. They feel that they lived much better in the Soviet Union, because they had safe jobs and secured retirement. Now it's all gone. Therefore, the communists are interested in making situation as bad as possible because they will benefit from frustration (Aslund 2000, p.271). Concealing its true plans, a political party may seize power in order to enjoy great opportunities of rent-seeking. If the expected gains are extraordinarily high the parties may amalgamate in coalitions, thereby increasing the probability of being winning coalition.

In order to test my hypothesis I use the following approach. First, I construct each party's political variable which is the product of the power index in period t and share of votes in region (i). I perform two types of analysis *ex-ante* and *ex-post*. The former is aimed to

investigate the effect of parties on the *ex-ante* appropriation of funds to the geographical regions. The data for this analysis are drawn directly from the Budget Law. The relationship between political end economic variables in this case is expected to be the strongest if any. An *ex-post* analysis includes the investigation of parties' effect on actually implemented budget. The correlation in this case is expected to be less significant because as it described in Chapter 3 Ukrainian government has most of the influence on the actual distribution of funds. Several economic control variables are taken into account. They are a region's population, industrial output, investment spending, pension and social arrears, nominal wage rate, and unemployment rate.

Chapter 1 introduces the issue and discusses its importance. Chapter 2 is devoted to a survey of the literature. In Chapter 3 focuses on actors, markets and institutions and their impact on the model. It also discusses the Ukrainian context in this section. Chapter 4 covers the theoretical part. Chapter 5 presents the empirical model and results and economic interpretation. Chapter 6 concludes with a discussion of obtained results and their economic interpretation. This chapter also discusses imperfections of the model in terms of omitted variables and different possible scenarios.

Chapter 2

LITERATURE REVIEW

There are lots of papers examining the impact of political parties on distribution of government spending across a country's regions or subsidies programs. They present different insights that shed light on the issue of distributive politics. So, in order to provide background for my research, first, I try to take a look at the fundamentals of Political Economy and Social Choice theory by reviewing the literature that is the most relevant for my thesis. Second, I examine more specific theoretic models of distributive politics and, finally, I provide an overview of some empirical studies that have been done in other countries and are similar to my study.

Shapley and Shubik (1954) developed a technique for an a priori evaluation of the power of each body in a committee. The paper lies at the core of my thesis because I use the Shapley value in order to evaluate the distribution of power inside the Verhovna Rada. The authors give the definition of power of the member of a committee and present a technique for evaluating the power index of each body in a parliament.

The decision-making that occurs in Verhovna Rada is voting by committee. Barbera, Sonnenschein and Zhou (1991) give a full characterization of voting by committees. What motives bring on the coalition formation among the political parties? Kirchsteiger and Puppe (1997) maintain that the motivation for coalition formation stems from office-seeking activities and policy preferences of particular party. The authors try to build the model which explicitly takes into account both incentives. It is shown that existence of the small number of political parties may result in stable coalitions while parliaments with large number of parties may have stable coalitions only under certain circumstances. Ukrainian Parliament consists of many political parties and empirical evidence suggests that coalitions are characterized by high volatility of their size.

Shenoy (1979) gives another approach to the issue of coalition formation. He assumes that the final number of players that will go together highly depends on the total payoff available as well as on the payoff that accrues to each player in each coalition[1]. Another approach to explaining the stability of a coalition and its minimal size was made by Dodd (1974). He

[1] It would be also interesting to analyze whether the formation of coalition in Ukrainian Parliament goes along with the ideas developed in Shenoy's models. The major problem that may arise here is availability of the data. It is sometimes too difficult to obtain information about final payoffs.

showed that variation of information certainty about final payoffs, objectives of other agents, etc. can significantly affect coalition size and its stability.

In my paper I am going to study the relationship between the distribution of power inside the Verhovna Rada and government expenditures across the regions. The hypothesis which I am going to test is whether outlays are skewed to the region that supported the particular party. Levitt and Snyder (1995) studied the role of parties in the geographical distribution of federal outlays in the USA. The general form of their model can be described as follows:

Outlays = f (Demographic vote share, voter turnout, party affiliation of district's representative, state capital, state population, district population, demographics)

The key result of the paper is that the amount of federal outlays is positively correlated with the number of Democratic voters in the region and the corresponding coefficient is statistically significant.

Atlas, Gilligan, Hendershott, and Zupan (1995) studied the relationship between the allocation of federal subsidies across the states and the representation of each state in the United States Congress. It is well known that two congressmen represent each state in the US Senate. However, population varies significantly across the states, so we observe unequal per capita representation of each state. The latter term is defined as the number of senators from a particular state in the US Congress per one constituent of the state. The authors use an econometric model in which the dependent variable, net spending, is regressed on two political variables SENATORS and REPRESENTATIVES, where each of them corresponds to the per capita state's representation in the Senate and House of representatives. Several control variables are also taken into account. The main findings suggest that the extent of per capita representation significantly affects the distribution of net spending across states. Levitt and Poterba (1994) went even further and studied relationships between state political competition and its economic growth. Despite the fact that they did not find strong evidence on the latter their results suggest that congressional representation of a state affected funds distribution.

Budge and Hofferbert R. (1990) found that there was strong correlation between postwar parties' election platforms and government expenditures. This implies that political parties in the United States were indeed strong organizations regarding the allocation of federal spending pie and they pursued policies that corresponded to the election platforms. Several empirical models examine the relationship between government spending, a party's platform and presidency under different set of assumptions. The distinguishing feature of the empirical specification is that it is quite simple and yields persuasive results.

Chapter 3

ACTORS, MARKETS, INSTITUTIONS

Now, let's look at main actors of the game. They are Verhovna Rada, the Parliament of Ukraine, the President of Ukraine, and the Council of Ministries of Ukraine. It may also turn out that local government authorities play important role in the process. It is also essential here to survey the rules under which the agents interact, i.e. official voting rules, the budget process and the ways in which funds are allocated.

Verhovna Rada is the only legislator body in the Ukraine. It consists of 450 deputies who are elected under a mixed scheme. 225 are elected according to the majority rule, and the rest are elected by proportional voting. In order to get into Ukrainian Parliament a party should receive at least 4% of all electorate votes. All deputies have the right to amalgamate in official factions.

Having been elected, each deputy receives official immunity that exempts him from any liability for committed crime unless Parliament abrogates the privilege. This right creates great incentives for people to apply for the position of a deputy because here one can see infinite possibilities for rent-seeking activities. Anders Aslund (2000, p.271) gives an example in which a group of deputies were paid $700,000 in order to pass a bill. Another common rent-seeking case takes place when a group of businessmen bribe a group of deputies in order to block a reform law (Anders Aslund 2000, p. 271). There is, of course, the probability of being punished but the process of bringing a legal action against the deputy is so complex and time-consuming that it makes it highly unlikely.

According to the Constitution of Ukraine Verhovna Rada is the only legislature body that passes the law about Ukrainian budget i.e. Parliament members are responsible for the allocation of government resources. They divide public spending pie across 25 aggregate budget items. The Council of Ministries or the National Bank of Ukraine can give proposals for the allocation of government spending but deputies make the final decision. Under these circumstances, I want to examine how the distribution of power inside Verhovna Rada affects the allocation of government expenditures using political-economic regression model.

According to the Constitution of Ukraine, all decisions are made with the help of voting and a simple majority rule is applied in order for a law to be passed with the exception of some laws. Based on these rules I can calculate each party's power index, which is measured by the

Shapley value. At present, there are 13 officially registered committee bodies in Verhovna Rada and 43 deputies are non-party players.

Table 1. Parties in Verhovna Rada (November 24, 2000)

#	Name of the party	# of members
1.	Trudova Ukraina	48
2.	Region's Party	37
3.	Solidarnist	23
4.	Batkivschina	31
5.	Communist Party of Ukraine	112
6.	Peoples' Democratic Party	19
7.	Narodny Ruch	19
8.	Green Party of Ukraine	17
9.	Reformy i Poryadok	15
10.	Social Democratic Party (united)	34
11.	Socialist Party	16
12.	Ukrainian Narodny Ruch	21
13.	Yabluko	14
14.	Independent deputies	43
	Total	449*

Source: Official web site of Verhovna Rada (http://guru.rada.kiev.ua:2000/)

* Actual number of registered deputies can be less than 450 due to various reasons such as employment at a government position, death, etc.

I turn now to a description of the budget process and the way in which funds are allocated.

According to the Budget Law of Ukraine the participants of the budget process are: the Parliament of Ukraine, the President of Ukraine, the Parliament Committee on budget issues, the National Bank of Ukraine (NBU), The Council of Ministries, local and municipal governments, government institutions, appropriation divisions and receivers of government funds.

An important issue for my thesis in the analysis of the budget process is the power of each government institution over the allocation of budget funds. Let me summarize the authorities that have the highest control over the resources.

The President of Ukraine is in charge of consideration and approval of the Budget Law. He can also impose a veto on the Law should he do not agree with the proposed pattern of spending.

Verhovna Rada determines the principles of budget policy, establishes powers of all institutions that are involved in the allocation of funds, and passes the Budget Law. The Parliament decides how much should be spend on national defense, education, different social programs; it is also up to the Parliament to determine the level of taxation in the economy; deputies also decide which industry should receive top priority, which one should be

subsidized, and etc. Verhovna Rada. The Parliament can dismiss the Council of Ministries should the latter:

a) not meet the deadline in budget implementation

b) contract spending without approval of the Parliament

c) not report on the budget fulfillment.

Verhovna Rada is in charge of establishing all items of Ukraine's government budget. The State Treasury of Ukraine conducts accounting of all transactions over the government's funds. The Ministry of Finance is not able to reallocate funds unless explicit approval of the Parliament budget committee is obtained.

Verhovna Rada entitles the Ministry of Finance to settle government capital spending. The former gives to the latter certain amount of funds for this purpose. In addition, the Parliament obliges the Ministry of Finance to fund a given list of capital spending, which is established by Verhovna Rada each year.

The Parliament of Ukraine entitles the Council of Ministries to do the following:

1) Determine the extent of compensation that arises due to the devaluation of households' deposits at the National Savings Bank;

2) Determine the extent and schedule of repayment of arrears of government institutions for electricity, heating, and other utilities;

3) Settle on repayment of debts of Defense Department, Ministry of Internal Affairs and other military units formed according to the Ukraine's legislation

Regional, local and rural authorities can only adopt their local budget and distribute funds assigned by the higher institutions. They are also allowed to submit budget proposals to the Verhovna Rada. In reality, local budget are not adopted until Budget Law is passed. This stems from regulation prohibiting local or municipal governments to pass a deficit budget.

The Council of Ministries has the following powers (*i*) projects and submits all relevant macroeconomic indicators to Verhovna Rada, (*ii*) prepares budget draft, (*iii*) makes the decisions as for allocation of government funds, which are constrained by the Verhovna Rada.

So, the Parliament of Ukraine exerts some degree of control over the allocation of government funds. This power is strong in distributing funds across aggregate items such as

national defense, education, health care, social security, servicing government debt, and etc. But it has considerable limitations in distributing funds across geographical regions. Primarily, it can be attributed to the increasing complexity of the budget process as the division of funds becomes more detailed. Just to give you an idea let me introduce some figures. There are 25 aggregate budget items and 27 administrative regions where funds should be distributed. Each aggregate item includes not less than 6-7 more detailed articles. If the deputies voted for all 25x6x27 items the budget process would stall. After describing the budget process in Ukraine let me turn to theoretical models that provide foundations for the issue of collective decision making.

Chapter 4

THEORETICAL FRAMEWORK

This chapter is devoted to the theoretical model. First, it deals with some fundamental aspects of the Social Choice theory that are crucial for the study. Second, more specific models of distributive politics are considered because they present the basis for empirical study.

I start off by giving major concepts and definitions from Social Choice theory that will be used in further analysis. Then I am going to present more specific notions that lie at the core of my thesis.

Let $N = \{1\ldots n\}$ be the set of voters. The set of alternatives is $K=\{1\ldots k\}$.

First, I start with the voting game in which each player has one vote and all votes are equal. Let W denote the collection of winning coalitions. In order for a coalition to be winning it has to have a size greater than some value q which is known as quota of the game. More formally, $W = \{S: |S| \geq q\}$, where $|S|$ denotes the size of the coalition S. The voting that occurs in the Verhovna Rada is a little bit more complicated. As I described in the previous chapter there are 13 parties and about 43 non-party deputies. This implies that 13 players have larger weights in passing the decision than other 43 members. The game like this can be defined by means of weighted majority game. Let N be the set of players: $N=\{1\ldots n\}$. w_i is the weight of each player ($i = 1\ldots n$). Then weighted majority committees can be characterized as follows: $[q; w_1,\ldots,w_n]$, where q is the quota of the game. A coalition S is winning iff $\Sigma w_j \geq q$.

I assume that decision-making that occurs in the Verhovna Rada is the game with transferable utility. This implies that our agents have quasi-linear utility function, i.e. money and goods enter in utility function as perfect substitutes (additively). This means that agents may transfer their utility by money payments. Shapley and Shubik (1954) proposed the method for the a priori evaluation of the power of a body in a committee in transferable utility games.

The definition of power is based on the probability of being critical for an agent to make the coalition be winning.

$v(S)$ – payoff of the coalition $S \subset N$. It can also be referred to the coalitional payoff function.

$v(N)$ – payoff of the grand coalition, $N = \{1,\ldots,n\}$.

Let me consider a simple example demonstrating the coalitional payoff function. Let we have three players in the committee. N={1,2,3}. The payoff function is given as follows:

$v(i) = 0$ that is if each player behave separately he gets nothing

$v(1,2) = 20$ – if 1 and 2 go together they get 20

$v(2.3) = 50$ – if 2 and 3 go together they get 50

$v(1,3) = 60$ – if 1 and 3 go together they get 60

$v(1,2,3) = 100$ – if all players go together they get 100

The issue that arises here is how to divide the payoff of 100 fairly among the players, because they are clearly better off by acting cooperatively. Shapley proposed method that is based on the marginal contributions.

Table 2. Calculation of payoffs for sharing of surplus.

Possible Orderings	Marginal Contribution		
	Player 1	Player 2	Player 3
1 2 3	0	20	80
1 3 2	0	40	60
2 1 3	20	0	80
2 3 1	50	0	50
3 1 2	60	40	0
3 2 1	50	50	0
Total	180	150	270

So the payoffs can be divided as follows:

$$\begin{pmatrix} P1 \\ P2 \\ P3 \end{pmatrix} = \begin{pmatrix} 180/6 \\ 150/6 \\ 270/6 \end{pmatrix} = \begin{pmatrix} 30 \\ 25 \\ 45 \end{pmatrix}$$

You can verify that all payoffs sum up to 100.

Shapley-Shubik power index refers to a simple game. The latter can be defined as follows:

$v(S) = 1$ for $\forall S \in W$

$v(S) = 0$ for $\forall S \notin W$, where W is the collection of winning coalitions.

Let Ω be the set of all orderings of players, (there are $n!$ elements)

w – the single order, $w \in \Omega$.

Definition: If $w \in \Omega$ and i is a player ; P_i^w - the set of all players who appear before i in the order w, then the power index that i gets equals:

$$\phi^i(v) = \frac{1}{n!} \sum_{w \in \Omega} [v(P_i^w \cup i) - v(P_i^w)],$$

where $v(P_i^w \cup i) - v(P_i^w) = 1$, if $v(P_i^w \cup i) = 1$ and $v(P_i^w) = 0$

and $v(P_i^w \cup i) - v(P_i^w) = 0$ otherwise for $\forall w \in \Omega$

The value $\phi^i(v)$ yields the probability that player i will be a pivotal , i.e. his contribution is critical to the success of a winning coalition.[2] It can be shown that $\sum_{i \in N} \phi^i = 1$.

Let's consider an example of calculating the Shapley value for each body of a committee. The weighted-majority game is given as follows: W = [3; 2, 1, 1] (3 members with different weights; the quota equals to 3).

[2] Shapley and Shubik (1954)

Table 3. Calculation of the Shapley value

Possible orderings, # of player	Weight of a player			Payoff function	Marginal Player
1 **2** 3	2	**1**	1	*v(1, 2) = 1*	2
1 **3** 2	2	**1**	1	*v(1, 3) = 1*	3
3 **1** 2	1	**2**	1	*v(3, 1) = 1*	1
3 2 **1**	1	1	**2**	*v(3, 2, 1) = 1*	1
2 3 **1**	1	1	**2**	*v(2, 3, 1) = 1*	1
2 **1** 3	1	**2**	1	*v(2, 1) = 1*	1

In the case presented above first player, who has weight of 2, is marginal in 4 events out of 6. This implies that the probability of being critical to the success of a winning coalition for player 1 is $4/6$ or $2/3$. Accordingly, for players 2 and 3 this value is the same and equals $1/6$.

According to the Constitution of Ukraine for a law in order to be passed more than a half of deputies should vote for it. So, the voting scheme can be characterized as quota game: W = [226; X_1, X_2,…, X_n], where 226 – quota (majority of official staff)[3], X_1, X_2,…, X_n – are weights of each coalition. The weight of a coalition is number of deputies it has. For the Parliament members that do not enter any party the weight is equal to 1. Officially the President of Ukraine does not enter any political party. So, the simple majority (1/2) can adopt the decision without forming absolute majority (2/3).

The second half of theory, which I use, deals with the distributive politics and the role of political parties in allocation of government resources. There are three main models that tackle the issue[4]. One model suggests that political parties do not affect considerably the allotment of resources, whereas congressional committees influence significantly the type and amount of government expenditures. This stems from the assumption that districts whose representatives have power over certain types of government subsidies can be favored. This model takes into account the features of US legislature's structure, that it is more focused on the institutional arrangements of specific country rather than on the behavioral aspects of the problem.

The second model maintains that each party optimizes the mix of reelection goals and own policy objectives. This viewpoint implies that party that has relatively high power may target certain regions that support it. Changes in a party's affiliation bring about immediate alteration in distribution patterns. Empirical evidence suggesting significance of the strong party model was found by Castles (1982), Rallings (1987) and Budge and Keman (1990).

[3] Actually quota can be less than 226. It depends on the number of deputies that are currently registered at the Parliament because the quota is half as great as the number of registered deputies.

[4] The formal presentation of these models is beyond the scope of the study. For that reason further description of them is taken from Levitt and Snyder (1995).

A third model considers groups of politicians who sometimes go together in order to satisfy their own interests. These interests may be occasionally contradictory which brings about certain limitation of the extent of possible collaboration (Kiewiet and McCubbins 1991, Cox and McCubbins 1993). If a party has majority over a long period of time it can fund set of programs that bolster party's constituents. If its power (size) become insufficiently small new comers would not be able to cease existing programs. However, the new majority may launch new programs. The difficulty with this analysis is very low number of observations. The analysis should focus on time series data and I have only observations at 7 different moments of time. In my thesis I focus on the second model and partially on third model; the latter helps to explain results obtained in Chapter 5.

Chapter 5

EMPIRICAL MODEL AND THE RESULTS

Now let me turn to the empirical part of my study. The data on the coalition size are drawn from the official WEB site of the Verhovna Rada (http://guru.rada.kiev.ua:2000/ukr/win/). The data concerning government expenditures are available at http://www.rada.kiev.ua/ in the Budget Law section. The results of 1994 and 1998 elections to the Parliament are taken from the Central Voting Committee official web site. Data on budget, and demographics are taken from the Treasury and UEPLAC publications.

As noted above, the power index measured by the Shapley value[5] should affect the allocation of government expenditures; therefore I consider it one of the key explanatory variables. The other important variable is the results of elections to the Parliament. These data relate parties to the regions, in the sense that they give us the idea of party affiliation of a particular region. Currently, there are 13 parties and 43 independent members. Formally, there are 56 players. So, in order to calculate the exact Shapley value the computer program has to look over 56! sets. With the current speed of personal computers it will take up to 300 years to accomplish this task. So it would be reasonable to reduce the number of players. The most appropriate way is to divide randomly independent deputies into several equal groups. I used the following procedure to pick the proper number of groups. It is clear, that as number of groups increases (up to 1 deputy per group) the estimated Shapley value converges to its true value. As I cannot estimate the latter I assume an error, which is an arbitrary small number for the change in the Shapley value (1%). So, I form smaller and smaller groups of independent deputies until absolute value of marginal change in the Shapley value for each party does not exceed cut-off value. This convergence test exposed that division into 5-6 groups satisfies the above criterion.

The model of distributive politics used in my analysis predicts that a party is inclined to increase spending in the area where the percentage of population that supported the party on election is the highest. This hypothesis was not refuted empirically by Levitt and Snyder (1995) Castles (1982), Rallings (1987) and Budge and Keman (1990).

I employ panel data methods for my analysis. The empirical analysis is divided into two parts: *ex-ante* and *ex-post*. First part deals with the data that are stated in the Budget Law of Ukraine.

[5] The algorithm of calculation of power index is presented in the Appendix B. The Shapley values for the coalitions are presented in Appendix C.

The only data on the distribution of funds across Ukrainian regions cover the resource transfers from central budget to the regional budget. As a matter of fact, these are the transfers from rich regions to the poor ones. For some geographical regions this figure can be negative thereby indicating net outflow of public funds from region to the central budget. Actually, at this stage the players have the greatest possible degree of control over government spending, because they have the opportunity to make changes directly in the Budget Law. Should the Council of Ministries not implement the Law Verhovna Rada can dismiss it. This implies that the Ministry has great incentive to enforce execution of the Law. The data set is a panel which covers the period from 1999 to 2001 with cross sectional division for 27 regions.

Including only political variables into the model will yield biased as well as inconsistent estimates. The amount of grants distributed to a region also depends on a set of economic and demographic variables. First, the amount of grants provided to a region should depend on budget deficit in this region. The idea stems from the definition of grants (Parliament of Ukraine 1998, 1999, 2000, 2001) which are provided to the regions in order to cover the expenses that are not covered by tax revenues. The sign of the corresponding coefficient is expected to be positive. An important fiscal variable is also tax revenues which should negatively affect subsidies distribution.

One of the key explanatory variables is also region's income which can be represented by GDP in each oblast. Such data are not available on yearly basis. For that reason I use industrial output, agricultural output and investment spending as a proxy for the income factor. In some respect this set up yields better fit because different oblasts derive income from various sources that is some regions specialize in agriculture and some on manufacturing. Investment spending variable serves as an indicator of real region's performance. High rate of investment in a particular region can serve as a proxy for real income, which cannot be directly observable. The capital would not be invested if real rate of return were low or negative. For this reason I expect negative sign of the corresponding coefficient. On the other hand, industrial or, especially, agricultural output may include explicit or implicit subsidy, so positive correlation with the amount of grants can be expected. So, the effect of these variables is ambiguous. Another good proxy for income is average wage rate. The government may try to support low income regions therefore not including this variable may yield significant bias. For this reason I expect the sign of corresponding coefficient to be negative.

In order to account for constituents' interest I use a set of demographic variables. They are average wage in a region, unemployment rate, percentage of individuals receiving pension. I also include pension and social benefits arrears as one of the regressors. An increase in the magnitude of this factor can deteriorate social tension and raise people's dissatisfaction with

the Parliament. Therefore, the deputies should be interested in lowering level of all kinds of arrears by providing funds. Hence, I expect the corresponding coefficient to be positive.

$$GRTPCAP(i,t) = \beta_1 + \beta_2 POLITVAR(i,t) + \beta_3 OUTPCAP(i,t-1) + \beta_4 INVESTCAP(i,t-1) + \beta_5 AGRCAP(i,t-1) + \beta_6 DEFCAP(i,t) + \beta_7 REVCAP(i,t) + \beta_8 UNEMPL(i,t-1) + \beta_9 WAGE(i,t-1) + \beta_{10} PENPERC(i,t-1) + \beta_{11} SARCAP(i,t-1) + \varepsilon(i,t),$$

Where the denoted variables are:

i	– index for oblast
t	– index for region
GRTPCAP	– government transfers per capita (UAH, Budget Law)
POLITVAR	– political variable, which is calculated as follows
POLITVAR(i,t) = PINDEX (t) * VOTES(i), where	
PINDEX	– the party's power index measured by Shapley value
VOTES	– share of votes that the party has in region i
OUTPCAP	– industrial output per capita (ths, UAH, UEPLAC)
INVESTCAP	– investment spending per capita (ths, UAH, UEPLAC)
AGRCAP	– agricultural output per capita (ths, UAH, UEPLAC)
DEFCAP	– planned budget deficit per capita (mn UAH, UEPLAC)
REVCAP	– planned budget revenues per capita(mn UAH, UEPLAC)
PENPERC	– percentage of individuals receiving pension (%, State Statistics Committee)
SARCAP	pension and social benefits arrears per capita at the end of a period (UAH, State Statistics Committee)
UNEMPL	– Unemployment rate, (%, UEPLAC, ILO definition)
WAGE	– Average wage rate, (UAH, UEPLAC)

The reason why I take lagged values for all control variables except for the deficit and expenditures is that I assume the adaptive expectation approach. At the time of passing Budget Law for the upcoming year there is no information about future values of the control variables. The only data that deputies have are the values of corresponding variables for current year. Therefore, I assume, they make decisions about a forthcoming fiscal year based on the available information pertaining to the current year. Fiscal variables are taken in period t because these are the data on planned public expenditures and revenues. They are also drawn directly from the Law.

The results of econometric analysis (Table 4) suggest that only 3 parties affected the distribution of government transfers to the region. One party, Regiony (Regions – eng.), that consists mainly of deputies elected under majority rule (about 90% of its deputies, as opposed to 50% of the average), positively influenced the inflow of funds to the regions where the deputies come from. It is evident from the size and significance of corresponding coefficient

of REG variable (Table 4). Next party that also had an impact on the distribution of government transfers is Trudova Ukraina (Working Ukraine), which is the second largest in Verhovna Rada. 70% of the members were also elected according to majority rule. The result suggests again that deputies that come from particular region are inclined to increase spending in their constituency.

Table 4.Pool–regression coefficients: transfers per capita to the regions as the function of political and economic variables, Random effect model.

GRTPCAP	Coef.	Std. Err	Z	P>|z|
KPU*	-411.73	192.93	-2.134	0.033
REG**	2867.14	1417.89	2.022	0.043
TRUD***	5186.98	1612.56	3.217	0.001
DEFCAP	417.29	158.95	2.625	0.009
REVCAP	-492.62	206.33	-2.388	0.017
OUTCAP	.03203	.01254	2.555	0.011
INVESTCAP	-.52984	.10961	-4.834	0.000
AGRCAP	.03990	.05555	0.718	0.473
UNEMP	3.98	3.70	1.075	0.282
WAGE	-.41392	.14511	-2.852	0.004
PENPERC	-.54358	5.37	-0.101	0.919
SARCAP	.17081	.60391	0.283	0.777
_CONS	297.03	136.22	2.181	0.029
R^2 = 0.79 Hausman specification test: P-value = 0.37				

* Communist Party of Ukraine

** Regions' Party

*** Trudova Ukraina (Working Ukraine faction)

Table 5. Regression results for the other most powerful parties

	Coefficient	P>|z|
"Nezalezhni	-3623.902	0.669
"Batkivschina"	-86.44	0.982
"Gromada"	-1504.8	0.262
"Narodny Ruch"	1001.084	0.189
"Green Party of Ukraine"	-4847.93	0.268
"Reformy i Poryadok"	-2407.68	0.716
"Social Democratic Party (united)"	311.77	0.830
"Socialist Party"	-252.009	0.938

An interesting result is obtained for the Communist Party. The coefficient of corresponding political variable, KPU, is negative and significant at 4% level. What this means is that the party deliberately decreased spending in regions where it received the strongest support. And there is nothing surprising here. The reason why communists are elected to the Parliament is the following. A significant part of Ukraine's population has grown in the Soviet Union. They still remember the good times when jobs were available for everyone, government granted

free housing and utilities, and etc. Transition of Ukraine's economy reduced real income significantly for the majority of population. For that reason, the eldest part of population believes that it would be better to return old times and therefore they vote for communists. So, the worse is the state of affairs in the economy, the higher credit the communists get (Aslund, 2000, p. 271).

According to the Hausman specification test (p-value = 0.37) the hypothesis that individual effects are uncorrelated with other regressors in the model cannot be rejected. The latter implies that our model specified correctly and we can use random-effect model. Now, let me say a few words about effect of economic variables. As you can see industrial output per capita, has positive and significant coefficient. This can be attributed to the effect of subsidization of certain industries by Ukrainian government. However, more interesting is the effect of investment spending. This variable explains about 25% of variation of dependent variable. As you see, the corresponding coefficient is negative and highly significant. And this outcome can be perfectly explained. According to standard theory of Industrial Organization the long-run investment occurs only if the industry is making profits. The coefficient of budget deficit in a region is significant what suggest that deputies are guided by the magnitude of the variable during legislative bargaining and making decisions about net transfers.

The regression results for the Communist Party may be distorted by a following factor. There is strong negative relationship between election results for the communists and some right-wing parties[6], i.e. in communist dominated regions right-wing parties were the least popular and vice versa (APPENDIX A, Table A2). This implies that negative effect of the Communist Party on grants distribution could be brought about by the actions of the coalition of right-wing parties. In the next step I construct a coalition of the right-wing parties and assume that they go together in order to achieve common goal. For this reason I recalculate the Shapley value and election variable for this coalition and for the other parties. If the impact of this coalition appears to be insignificant then we can conclude that the Communist Party did not favored its dominated regions thereby increasing level of people's dissatisfaction with the government. I use the same econometric model. The results are presented in Table 6.

Table 6. Pool-Regression coefficients: transfers per capita as a function of political and economic variables. Random effect model

GRTPCAP	Coef.	Std. Err	z	P>|z|
RIGHT*	502.51	335.77	1.407	0.150
REG	3217.20	1453.55	2.213	0.027
TRUD	5229.50	1734.72	3.015	0.003
DEFPLCAP	415.87	161.74	2.571	0.010

[6] they are. Narodny Rukh and Reformy i Poryadok.

RPLCAP	-521.88	210.98	-2.474	0.013
OUTPCAP	.03143	.01261	2.492	0.013
INVPCAP	-.49809	.10983	-4.535	0.000
AGRCAP	.07520	.05079	1.480	0.139
UNEMP	4.59	3.76	1.223	0.221
WAGE	-.36384	.14479	-2.513	0.012
PENPERC	-2.73	5.19	-0.527	0.598
SARCAP	.28922	.60739	0.476	0.634
_CONS	260.51	140.97	1.848	0.065
R^2 = 0.80 Hausman specification test P-value = 0.16				

* Coalition of right-wing parties.

The results in the above table suggest that the coalition of right-wing parties did not have any significant effect on the distribution of government expenditures. It is also reasonable to verify that effect of the Communist Party is still high enough since under these circumstances it has much less power. Table A1 (APPENDIX A) presents the results which suggest that the communists indeed negatively affected the allocation of government transfers to the regions. It is also worth noting that the Regions' Party and Working Ukraine also influenced the distribution pattern.

The empirical model for ex-post analysis is almost identical to that of ex-ante except for the index *t* and variable WAGARCAP, which accounts for the effect of total wage arrears per capita.

$$GRTPCAP(i,t) = \beta_1 + \beta_2 POLITVAR(i,t\text{-}1) + \beta_3 OUTPCAP(i,t) + \beta_4 INVESTCAP(i,t) + \beta_5 AGRCAP(i,t) + \beta_6 DEFCAP(i,t) + \beta_7 REVCAP(i,t) + \beta_8 UNEMPL(i,t) + \beta_9 WAGE(i,t) + \beta_{10} PENPERC(i,t) + \beta_{11} SARCAP(i,t) + \beta_{11} WAGARCAP(i,t) + \varrho(i,t),$$

Table 7. Pool-regression coefficients: executed transfers per capita as a function of political and economic variables..

Subsidies per capita	Coef.	Std. Err	z	P>|z|
KPU	-207.73	74.99	-2.770	0.006
REG	422.19	591.34	0.714	0.475
TRUD	4374.0	1400.18	3.124	0.002
DEFCAP	232.98	59.46	3.918	0.000
REVCAP	-311.44	41.13	-7.572	0.000
OUTCAP	.00112	.00542	0.207	0.836
INVCAP	-.03627	.04025	-0.901	0.368
AGRCAP	.06526	.01964	3.322	0.001
WAGE	-.13063	.06660	-1.961	0.050
UNEM	-.83373	1.18	-0.706	0.480
PENPERC	-2.04	1.79	-1.138	0.255
SARCAP	-.08844	.26225	-0.337	0.736
WAGARCAP	.21739	.08220	2.644	0.008
_cons	139.88	44.99	3.109	0.002
R^2 = 0.90 Hausman specification test P-value = 0.33				

Table 7 presents results for implemented budget. First three rows present the effect of the Communist Party (KPU), Regions faction (REG) and Working Ukraine faction (TRUD). Again, the Communist Party revealed strong results in terms of statistical significance; however, the corresponding coefficient is only half as large as that of for planned subsidies. This fact tells us that the communists exerted their power however it is much limited when budget gets implemented. The results for Working Ukraine faction are almost identical in both cases, while Region's faction has insignificant influence in the latter case. This can be attributed to a short period of existence of the party, it was established in late February 1999, therefore it could influence only the distribution of subsidies for the years 2000 and 2001. The set for implemented budget covers only years 1998-2000 therefore the Region's Party could have affected grants allocation only in the year 2000 and partially in year 1999. But this did not happen. This result can be explained by the third model of distributive politics which is presented in Chapter 4. The party was not able to affect existing programs but it may have tried to launch new ones. As a result we see no effect on executed budget and significant effect on planned funds allocation.

I added wage arrears per capita (WAGARCAP) to the latter model because I consider it an important factor for ex-post distribution of grants. The significance and sign of the corresponding coefficient suggests that wage arrears influenced grants distribution. One important aspect is worth noting here. The results for executed budget revealed reversed income effect, that is industrial output and investment spending did not have significant effect on grants, while agricultural output per capita appeared to have strong positive influence. This fact implies that subsidization of the agricultural sector in Ukraine is still in progress.

The negative effect of the Communist Party may be brought about by the Median Voter Theorem, which states that the position of median voter solves the voting game. The communists tend to receive the highest support in industrialized regions (Donetsk, Dnepropetrovsk, Lugansk, Kharkov) and lowest support in low income regions (Ternopol, Ivano-Frankovsk, Zakarpatskiy). So, there may be very little effect for targeting these areas in order to increase proportion of votes. It might pay for the communists to target regions where they received share of votes roughly equal to that of in Ukraine (24.6%). In order to test this model I dropped from the sample 5 regions in which shares of votes where less than 5% or higher than 40% respectively. The obtained results do not refute the hypothesis that the Communists Party negatively affected distribution of grants to its dominated regions. The effect for ex-ante allocation appeared to be even stronger, the magnitude of coefficient is higher and confidence level is above 99%.

To conclude this section I would like to perform sensitivity analysis which can interpret the results better. Suppose that by the end of this year the Communist Party will get ten more members[7]. At that time voting for government budget 2002 will take place. The question that arises here is what will be the effect of that transfers on grants distribution. Let's assume also that the size of all other parties will stay constant. I recalculate the Shapley value for the Communist party which increases from 0.302 up to 0.338. This implies that depending on a region's affiliation it will get less grants by the amount of 48,6*VOTES(i) UAH per capita. For instance, an average Crimean will get UAH 14,4 less in year 2002 than in 2001. For Lviv oblast the corresponding figure is only UAH 0.99. Ivano-Frankovsk and Ternopil will not suffer at all because the communists get zero votes there. An increase of share of communists' votes by 1% in a region i would imply a decrease in net transfers per capita by UAH 4.12 (Table 4.) In the latter case I assume that all parties remain constant in size.

[7] Just for simplicity, I assume that these players transfer from the group of independent deputies.

Chapter 6

CONCLUSION

The models of interdependence between economic and political systems in Ukraine which I presented in this paper are rather simple. Many important factors are omitted from the analysis. However, the obtained results allow making certain conclusions about the behavior of political parties and their effect on the distribution of government resources. First of all, only three parties appeared to enjoy their power and affect the distribution of government subsidies. Two factions positively influenced the allocation of transfers, thereby indicating an effort to increase spending in the regions where these parties are most popular. The party called "Working Ukraine", which on 70% consists of the deputies elected according to majority rule, influenced the division of grants to higher extent than the others. This fact poses the question for further research which is what system of voting is more efficient in Ukraine, i.e. whether there is any difference in benefits accruing to constituents depending on applied election rules. Finally, reverse effect in allotment of public spending across geographical regions was revealed for the Communist Party.

In this study I investigated the impact of parties on geographical distribution of grants that are not assigned for particular type of spending, i.e. social benefits, health care, education, national defense, and etc. As I said earlier, the Parliament has rather limited power over these types of spending. However, the estimation of the effect of parties on this type of spending may capture the following effect. Each party may target certain types of expenditures that in its opinion are politically vulnerable. For instance, Green Party has the reputation of an ardent opponent to environmental pollution; therefore they are expected to target this type of expenditures. Oligarchs' party may promote subsidies to certain industries and so on. Testing this kind of model requires larger set of control variables and more complicated models.

One important aspect of Ukraine's legislative system is omitted in my thesis. If we take the President, who has a veto power, into account the rules for the quota game somewhat changes (Chapter 4). This fact has direct consequences on the magnitude of Shapley value and therefore on political variable. Moreover, Fedjora (2000) found that the results of presidential election in Ukraine affected the distribution of transfers to regions.

Obtained results suggest topics for further research. The fact that the parties that consisted on 80% of deputies elected under the majority rule affected ex-ante grants distribution poses an interesting question. What voting scheme would be more preferred to Ukrainian voters? Next important topic would be to study the effect of the Communist Party on oblasts' economic

growth. The importance of the above issue stems from the empirical results and Anders Aslund's argument about performance of the communists in Ukraine during the transition period. In addition to economic growth privatization process and wage arrears could also be considered as dependent variables.

The implication of this work is that the methods applied in here could be used for other transition countries and many European democracies.

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APPENDIX A

Table A1. The Effect of the Communist Party after controlling for the effect of right-wing coalition

GRTPCAP	Coefficient	Std. Err.	z	P>|z|
KPU	-548.73	294.94	-1.860	0.060
REG	2779.23	1434.93	1.937	0.053
TRUD	5396.52	1719.97	3.138	0.002
DEFCAP	434.54	160.71	2.704	0.007
REVCAP	-519.39	208.256	-2.494	0.013
OUTPCAP	.03346	.01265	2.646	0.008
INVPCAP	-.52296	.11039	-4.737	0.000
AGROCAP	.03628	.05704	0.636	0.525
UNEMP	3.87	3.74	1.035	0.301
WAGE	-.4099	.1465	-2.798	0.005
PENPERC	-.6841	5.43	-0.126	0.900
SARCAP	.2272	.6075	0.374	0.708
_CONS	296.34	137.65	2.153	0.031
R^2 = 0.79 Hausman specification test P-value = 0.29				

The model:

$KPU_i = \beta_1 + \beta_2 RIGHT_i + e_i$,

Where *i* - index for a region *i*,

KPU - results of elections for the Communist Party

RIGHT - results of elections for the coalition of right-wing parties.

Table A2. Results of the OLS estimation for communist competing parties.

Number of obs. = 27
F(1, 25) = 48.19
Prob > F = 0.0000
R-squared = 0.66
Adj R-squared = 0.64

KPU	Coef.	Std. Err.	t	P>|t|
RIGHT*	-.971	.1402	-6.933	0.000
_cons	.364	.0232	15.738	0.000

* RIGHT – Rukh, Reformy i Poryadok ,

APPENDIX B

The text of computer program written on MS Visual Basic for Applications allows calculating the Shapley value for a committee voting system with 4 coalitions. Actually, in my thesis I calculate Shapley value for up to 18 coalitions. I do not give program for 18 coalitions for space saving purposes because it uses the same algorithm (block L2 is repeated 14 times with increasing number of home loops). One run of the program presented below calculates power index only for one coalition, which size is in cell(2,3) off the worksheet "data". In order to find power index for every coalition one should run program several times making appropriate alterations in the worksheet where the data is stored.

```
Sub Shapley4()
Const NOC = 3
Dim Quota As Variant
Dim Size(NOC) As Variant, Shapley As Variant
Dim S, S1, S3, S2, Main As Variant, V, V1, V2, V3 As Variant
Dim i As Integer, i1 As Integer, i2 As Integer, i3 As Integer
Dim j As Integer, k As Integer, w As Integer              'Declaring variables
Main = Worksheets("data").Cells(2, 3).Value
   Shapley = 0
   Quota = Worksheets("data").Cells(1, 6).Value          ' Entering data
   Worksheets("data").Select
   Worksheets("data").Range("c3:c5").Select
   Worksheets("data").Range("c3").Activate
   Selection.Sort Key1:=Worksheets("data").Range("C3"), Order1:=xlDescending,
Header:=xlNo, _
   OrderCustom:=1, MatchCase:=False, Orientation:=xlTopToBottom
   For i = 1 To NOC
   Size(i) = Worksheets("data").Cells(i + 2, 3).Value
   Next
      If Main >= Quota Then Shapley = Shapley + Factorial(NOC)
      S1 = Size(1) + Main
   If S1 < Quota Then GoTo L2
   For i = 1 To NOC
    V1 = Size(i)
If V1 + Main >= Quota And V1 < Quota Then Shapley = Shapley + _ Factorial(NOC - 1)
   Next
L2: k = 2: S2 = Summa(k, Size()) + Main
    If S2 < Quota Then GoTo L3
     i1 = 1: i2 = 2
w2:  V1 = Size(i1): V2 = Size(i2)
    If V1 + V2 + Main >= Quota And V1 + V2 < Quota Then Shapley = _
    Shapley + Factorial(NOC - k) * Factorial(k)
     If i1 < NOC - 1 Then
      If i2 < NOC Then
        i2 = i2 + 1: GoTo w2
      End If
      i1 = i1 + 1: i2 = i1 + 1: GoTo w2
```

```
    End If
L3: k = 3: S = Summa(k, Size()) + Main
      If S < Quota Then GoTo L4
    V = Summa(k, Size())
   If S >= Quota And V < Quota Then Shapley = Shapley + Factorial(NOC)
   Worksheets("data").Cells(2, 4).Value = Shapley / Factorial(NOC + 1)
L4: End Sub
```

```
Function Factorial(n)          'Function for calculation of the factorial
   If n <= 1 Then  ' Reached end of recursive calls.
      Factorial = 1   ' (N = 0) so climb back out of calls.
   Else    ' Call Factorial again if N > 0.
      Factorial = Factorial(n - 1) * n
   End If
End Function
```

```
Function Summa(n As I nteger, Size() As Variant) As Variant
Dim t As Integer              ' Function for calculation of the sum of first
Summa = 0                     '  n elements of an array.
For t = 1 To n
Summa = Summa + Size(t)
Next
End Function
```

APPENDIX C

Table C1. Shapley value for parties in the Ukrainian Parliament.

	July 98	Oct 98	Jan 1999	Jan 2000	Jan 2001
Trudova Ukraina	0	0	0	0.046	0.102
Region's Party	0	0	0	0.075	0.074
Nezalezhni	0.055	0.049	0.038	0.028	0
Solidarnist	0	0	0	0	0.047
Batkivschina	0	0	0	0.073	0.066
Gromada	0.095	0.092	0.091	0.028	0
Communist Party of Ukraine	0.312	0.321	0.330	0.321	0.305
Peoples' Democratic Party	0.195	0.187	0.155	0.055	0.040
Narodny Ruch	0	0	0	0.035	0.035
Green Party of Ukraine	0	0.057	0.056	0.037	0.035
Reformy i Poryadok	0	0	0.028	0.026	0.030
Progressive Socialist Party	0.054	0.027	0.028	0.022	0
Selyanska Partiya Ukrainy	0.028	0.027	0.030	0.030	0
Social Democratic Party (united)	0.054	0.048	0.049	0.073	0.069
Socialist Party	0.068	0.051	0.049	0.044	0.032
Ukrainian Narodny Ruch	0.101	0.100	0.095	0.053	0.047
Yabluko	0	0	0	0	0.028