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RENT-SEEKING IN DEVELOPED AND DEVELOPING COUNTRIES:

CROSS SECTION AND TIME SERIES STUDIES

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Abstract

The property rights issue is one of the most important institutional differences between developed/developing countries. The violation of the property rights results with rent-seeking. In order to see if the extent of rent-seeking differs significantly between developed and developing countries, I applied a cross section and a time series study with the intention to measure rent-seeking. I found that rent-seeking is low in developed countries whilst it is high in developing counterparts. Turkey, as a developing country was my special case to apply time series study to see if rent-seeking vary over the years. In my additional work for Turkey, I found that there is a cointegrating relationship between rent-seeking as a percentage of the budget LnR_t and government size ($LnGY_t$), and GNP per capita income ($LnGNPC_t$).

Key Words: Rent-Seeking, Budgetary Allocation, Cross Section Study and Time

Series Study

1.   Introduction

In order to apply a measurement technique to see if the extent of rent-seeking differs significantly between developed and developing countries, in this paper, I first look at property rights issue in developed/developing countries as one of the institutional differences, then I intend to apply a few measurement techniques in order to examine the implication that rent-seeking activities differ between developed and developing countries. According to Katz and Rosenberg (1989:140), "developed economies with established hierarchies tend to be less wasteful than less developed economies, which are typically still trying to find their political and social identity by shifts in the relative power of pressure groups".

In their study, Katz and Rosenberg presented quantitative measures of rent-seeking for 20 countries. By extending Katz and Rosenberg's time period, which was for the period 1970-1985, I examine a cross section of 20 countries during the period 1974-1994 to see if Katz and Rosenberg's conclusion is robust. In addition, I conduct a time series study for Turkey during the period 1960-1994. In both studies, I use Katz and Rosenberg's measure of rent-seeking, which captures waste as a proportion of government spending for the government's budgetary allocation.

Katz and Rosenberg (1989:140) stated that, "strong property rights reduce rent-seeking activities". Therefore, I discuss property rights very briefly in the next section before I start our empirical analysis, since it is one of the fundamental issues in many developing economies. In particular, this brief explanation of property rights might help us to understand rent-seeking in a developing country like Turkey.

2.   Property Rights and Rent-Seeking

Many developing countries are in a vicious circle of low living standards (low per capita national income, unequal distribution of national income, poverty, poor health and education opportunities); low levels of productivity; high population growth rates;

high unemployment; high foreign debts; underdeveloped industries; high dependency on agriculture etc. (Thirwall, 1991). In addition to these common characteristics, developing countries also suffer because of weak economic and political institutions; such as unprotected property rights, absence of a constitutional framework and undeveloped government that cannot carry out its functions properly.

It is widely accepted that governments, in general, play an important role in stimulating economic activity by operating their functions appropriately and effectively. In particular, the main functions of government in both developed and developing countries are expected to be; maintaining public services, influencing attitudes, shaping economic institutions, influencing the distribution of income, influencing the use of resources, controlling the quantity of money, controlling economic fluctuations, ensuring full employment and influencing the level of investment (Lewis, 1963).

There is no doubt that we all need government to protect us, to secure our rights from violation and to provide public goods that cannot be well provided through ordinary market processes. The ability of governments to use their monopoly of legitimate forces is central to the fulfilment of those tasks. However, this monopoly power may be used for other purposes. Governments may do things for bad reasons that are essentially corrupt, e.g. giving favours to their supporters. Therefore, governments may fail either because they do too little, or because they do too much. In many developing countries, the degree of economic power of governments dominates their political power, since they find it difficulty to isolate the economic role of the state from its political, social and military roles.

If governments do the right things economic growth and political stability might be achieved. Nevertheless, if they do too little or too much or the wrong things, growth and stability are retarded. For instance, protectionism in trade in many developing countries is still seen as one of the main functions of a dominant state[1]. This point led Hayek (1944) and many other liberal economists to argue that an extension of state

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[1] Economically, politically and socially dominant state.

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ownership or the forms of the state involvement in the economy necessarily gave rise to a totalitarian, repressive political system.

Indeed, in many developing countries, governments fail to maintain equality, promote the exploitation of one class by another and neglect public services. At the same time, they may put in place excessive controls (by regulations) and end up with over spending. More importantly, rather than protecting rights from violation, governments use their power as an instrument of violation of property rights as much of the literature on rent-seeking notes. As it is known, if capital formation is one of the conditions of economic growth, the existence of a law of property is one of the conditions of capital formation. With the concept of property I mean the legal right to exclude other people from using a particular resource. In order to secure property rights it is necessary for governments to protect public property from private abuse and it is necessary to protect private property from public abuse and private abuse. Nevertheless, governments in developing countries often use their authority and their confiscatory power to provide privileges desired by particular politically-influential people at public expense (Tullock, 1993). In other words, if governments cannot or do not want to protect the property rights of the public for the favour of some privileged groups, rent-seeking increases. According to Tullock (1967), undesirable rent-seeking occurs in the case of unwilling uncompensated transfers. On the same line, McNutt (1996:164) emphasised that "when I interpret rent-seeking activity as an abridgement of property rights, then traditional rent-seeking is undesirable if the individual or society is inadequately compensated for the transfer of resources that takes place". If these uncompensated groups are investors whose property rights are not protected and whose welfare losses are uncovered, capital is discouraged and this deepens the vicious circle of poverty of developing countries.

Although these unprotected property rights issues seem to be mainly a problem of developing countries, it actually affects both groups of countries but to a different degree. It is certainly true that rent-seeking is everywhere, but at different levels. In the public choice approach, it is considered that a theory of property rights is a very important issue and requires a complete theory of 'the state'. As an extension of this

idea it is also considered that property rights, the state structure and rent-seeking activities are closely interrelated with each other. For this reason, in order to reduce rent-seeking, Tullock (1993) suggests several political reforms that might improve violated property rights. These are; qualified majority voting, greater use of referenda, a balanced budget, limits on the size and the extent of government, and better constitutional enforcement.

In the light of the property rights issue, in section III I undertake a cross section study to examine the extent of rent-seeking in both developed and developing countries. I consider that if rent-seeking is the violation of property rights, it can be interesting to associate and compare rent-seeking with different institutional settings in cross section study. In order to carry out this analysis I take changes in government budget categories as a proxy for rent-seeking. This is a method suggested by Katz and Rosenberg (1989). Our main intention is to compare our results with those of Katz and Rosenberg to see if there are any significant changes since their study was published in 1989. First I need to explain what Katz and Rosenberg's idea is, how they measure rent-seeking and what are the main weaknesses and strengths of the approach.

3. Rent-Seeking and Budgetary Allocations

Katz and Rosenberg (1989) considered that government transfers generate waste and lower actual national income, whilst not necessarily changing the accounting of national income[2] . So that they offered a method to measure the waste due to rent-seeking which results from the government's budget. Their rent-seeking measure was the proportion of government spending for the government's budgetary allocation (including transfers). Although Katz and Rosenberg's important component of the measurement was government transfers (which was referred originally by Tullock in 1967) they considered the employment of changes in government spending as being subject to full dissipation by rent-seeking, rather than only changes in government transfers. Katz and Rosenberg stressed that they might have overestimated the rent-seeking when the changes in government spending is considered. For them, the main

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[2] Indeed, even the composition of accounting national income might remain unchanged.

reason for that was the unavailability of data on the changes in government transfers. By employing the government spending, they divided the budget into nine categories including; Health, Defence, Education, etc. and took the changes in each of the nine categories beaten period (t-1) and (t) as a proxy for rent-seeking. With this study, they intended to fill the gap in the area of the macroeconomic effects of rent-seeking, since many studies have dealt mostly with rent-seeking effects of microeconomic government intervention such as government's microeconomic policy or regulation.

Katz and Rosenberg's estimates of rent-seeking induced by the government budget, Ire based on two assumptions. First, they assumed that every interperiod change in government budget categories arises from rent-seeking activities by special interest groups. Katz and Rosenberg considered that rent-seeking battles take place in order to alter the structure of property rights over the budget at the margin. Hence, any change in the proportional composition of total government spending was assumed to be indicative of a waste of resources resulting from rent-seeking. With that assumption it was characterised that there is a direct connection exist beaten transfers in the budget and the rent-seeking activity. This assumption views government spending as self-serving by the government rather than as an altruistic response to the needs of public.

Katz and Rosenberg's second assumption was that the aggregate net benefit from this special rent-seeking is zero, i.e. resources are expended until the marginal benefit from budgetary allocations is equal to marginal cost. Thus, the activities of special interests groups in pursuit of rents are a pure waste of national resources. This point can be explained better with an example. Katz and Rosenberg considered an economy consisting of three sectors; an agricultural sector, an industrial sector and a service sector. Initially it is assumed that there is no government intervention in this economy. Later, it is considered the case that the government intervenes in the economy by taxing people, who employed in the service sector and announces that this collected tax will be given either agriculture or industry. Under the circumstances that there are no income and substitution effects of those taxes and transfers, it can be speculated that either agriculture sector or industrial sector (but not both groups) will obtain these benefits (which are the tax receipts from the service sector). From the

rent-seeking perspective, it is obvious to expect that both groups (agricultural sector and industry sector) will have an incentive to lobby the government in the attempt to divert these funds thorough themselves. Katz and Rosenberg commented on that the amount to be given to either group is equal to the rent-seeking activity, which uses up resources but do not increase the size of the national pie. In particular, since these government transfers generate waste, they lower actual national income, but not necessarily reducing the accounting of national income. Therefore, this rent-seeking activity is considered as a social cost to the whole society.

In the next section, under the light of these assumptions, I explain Katz and Rosenberg's technique and how they estimated the extend of rent-seeking waste due to certain types of government transfers and spending.

3.1.   Katz and Rosenberg's Model and Their Rent-Seeking Measures

Katz and Rosenberg intended to capture the total change in the proportional allocation of government spending for different purposes. Since they assumed that; (i) rent-seeking activity done by pressure groups which use up real resources in their rent-seeking , and (ii) the total rent-seeking done is equal to the total change in the budget's proportional allocation for different purposes, they define a variable R_{tj} as rent-seeking for budgetary allocation (as a proportional of overall government spending). R_{tj} is based upon absolute changes in the proportion allocated to different budgetary categories in year (t) over year (t-1) as follows:

$$R_{tj} = \frac{1}{2} \sum_{i=1}^{n} \left| S\left(t\right)_{ij} - S\left(t-1\right)_{ij} \right| \qquad (1)$$

where $S\left(t\right)_{ij}$ and $S\left(t-1\right)_{ij}$ are the proportions of the budget going to purpose i in year (t) and (t-1) respectively, n is equal to the number of categories in the budget, and the division by 2 is done to avoid double counting, j is the number of countries, j = 1,2,3...,20. So that R_{tj} is one half of the sum of the sum total of the absolute changes

in the proportion allocated to different budgetary categories in year (t) over year (t-1).
It is accepted to lie beaten $0 < R_{tj} < 1$. In Katz and Rosenberg's paper the value[3] of R_{tj}
is calculated for each year for the period of 1970-1985 for 20 countries by dividing the
budget into nine purposes including; Defence, Health, Education   etc., and by using
UN's Governmental Financial Statistics. The mean values of R_{tj} over time for these
20 countries Ire calculated as follow :

$$R_{cj} = \sum_{t=1}^{T} R_{tj} / T \qquad (2)$$

where T is the number of years and R_{cj} can be viewed as representing the mean rent-
seeking in country j.

Another measure of the waste induced by rent-seeking is denoted by W_{cj}, which
depends on R_{cj} and government expenditure as a percentage of GNP, (G/GNP) that
the government expropriates by its spending. Whilst R_{cj} tells us of the inefficiency in
government spending it may be of little consequence if the government sector is small.
Thus, the measurement of W_{cj} is important if a judgement is to be made of the social
cost of rent-seeking. This calculation of waste is:

$$W_{cj} = R_{cj} \cdot (\frac{G_{cj}}{GNP_{cj}}) \qquad (3)$$

where G_{cj} is the mean of government expenditure and GNP_{cj} is the mean of national
income in each country. Again it is assumed that $0 < W_{cj} < 1$.

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[3] Actually, they consider that most rent-seeking takes place between sub-departments or purposes. So
that these aggregated data are likely to lead to underestimates of the amount of rent-seeking taking
place.

Our aim is to repeat Katz and Rosenberg's study for the period 1974-1994 for the same 20 countries using the same technique. The initial year of our analysis is 1974, not 1970 as Katz and Rosenberg used. This is because, our data sources are different (our data are from IMF's Governmental Financial Statistics and their data are from UN's Governmental Financial Statistics).

3.2.   Empirical Results:

In TABLE.1, Katz and Rosenberg's results are given in the third and fourth columns, whilst Demirbas's findings are presented in the fifth and sixth columns in order to facilitate comparisons. Both R_{cj} and W_{cj}, are multiplied by 100 in order to measure rent-seeking, in cents, per each dollar spent by the government.

TABLE 1   Estimates of Rent-Seeking in a Cross-Section of Countries

		KATZ & ROSENBERG : 1970-1985	DEMIRBAS : 1974-1994

No	Countries	R_{cj}.100	W_{cj}.100	R_{cj}.100	W_{cj}.100
1	Australia	2.87	0.81	4.03	1.24
2	Belgium	2.13	0.73	2.91	1.48
3	Canada	2.61	0.59	3.26	0.74
4	France	1.28	0.51	2.61	1.10
5	Germany	1.38	0.20	2.02	0.61
6	Greece	5.28	1.25	6.58	1.15
7	Italy	7.31	2.65	5.55	2.26
8	Spain	2.92	0.66	5.23	1.76
9	Sweden	2.59	0.92	3.26	1.49
10	Switzerland	2.10		1.77	0.17
11	UK	2.55	0.89	3.12	1.21
12	USA	2.80	0.62	2.40	0.57
13	Chile	5.32	1.99	10.22	2.33
14	Egypt	10.19	5.19	8.22	3.49
15	Indonesia	7.85	1.80	6.47	1.72
16	Israel	7.58	5.43	9.51	4.63
17	Kenya	3.97	0.99	5.48	4.48
18	Korea	6.08	0.99	4.51	0.66
19	Mexico	10.16	1.75	11.10	2.55
20	Turkey	7.70	1.78	9.73	1.86

where;

R_{cj} : The mean value of R_t over time (x100 to find the rent-seeking waste, in cents, per dollar spent by the government).

W_{cj} :   A measure of the waste induced by rent-seeking for budgetary

allocation as a percentage of GNP (x100 to find the rent-seeking waste,

in cents, per dollar spent by the government).

As can be seen from TABLE 2, after I altered the period and extended it from 15 years to 21 years, I ranked both Demirbas results and Katz and Rosenberg results to see if there are significant differences. Despite few major changes I found out that many countries moved only one or two steps, but stayed in their developing and developed economies groups. For example, Korea was in the 12th place in ranking by W_{cj} in Katz and Rosenberg's study, However, Korea climbed the 4th place in Demirbas's study. It means that in Korea, rent-seeking was subject to a reduction that is achieved either by reducing the rent-seeking waste as a proportion of GNP or by reducing the government share in GNP. On the other hand, Spain as a developed economy dropped from 6th place to 13th place. It means that rent-seeking activities increased substantially after 1985 in Spain up to 1994.

In addition, Turkish budgetary rent-seeking showed a reduction in Demirbas study. It was on the 15th place in ranking by W_{cj} Katz and Rosenberg study, then it climbed to 14th place in Demirbas's result. Although it is not a substantial reduction, it still can be interpreted as an improvement.

I can also see the distinction beaten developed and developing countries of Demirbas study in FIGURE 3.

TABLE 2   Rank Correlation Between Demirbas and Katz -Rosenberg Results

DEMIRBAS: 1974-1994			KATZ & ROSENBERG: 1970-1985		
Countries	Rank by	Rank by	Countries	Rank by	Rank by

	R_{cj}	W_{cj}		R_{cj}	W_{cj}
Switzerland	1	1	Switzerland	3	1
USA	3	2	Germany	2	2
Germany	2	3	France	1	3
Korea	10	4	Canada	7	4
Canada	7	5	USA	8	5
France	4	6	Spain	10	6
Greece	15	7	Belgium	4	7
UK	6	8	Australia	9	8
Australia	9	9	UK	5	9
Belgium	5	10	Sweden	6	10
Sweden	8	11	Kenya	11	11
Indonesia	14	12	Korea	14	12
Spain	11	13	Greece	12	13
Turkey	18	14	Mexico	19	14
Chile	19	15	Turkey	17	15
Mexico	20	16	Indonesia	18	16
Italy	13	17	Chile	13	17
Egypt	16	18	Italy	15	18
Kenya	12	19	Egypt	20	19
Israel	17	20	Israel	16	20

FIGURE 3   Relation Between Rent-Seeking and GNP per capita Income for
the period 1974-1994.
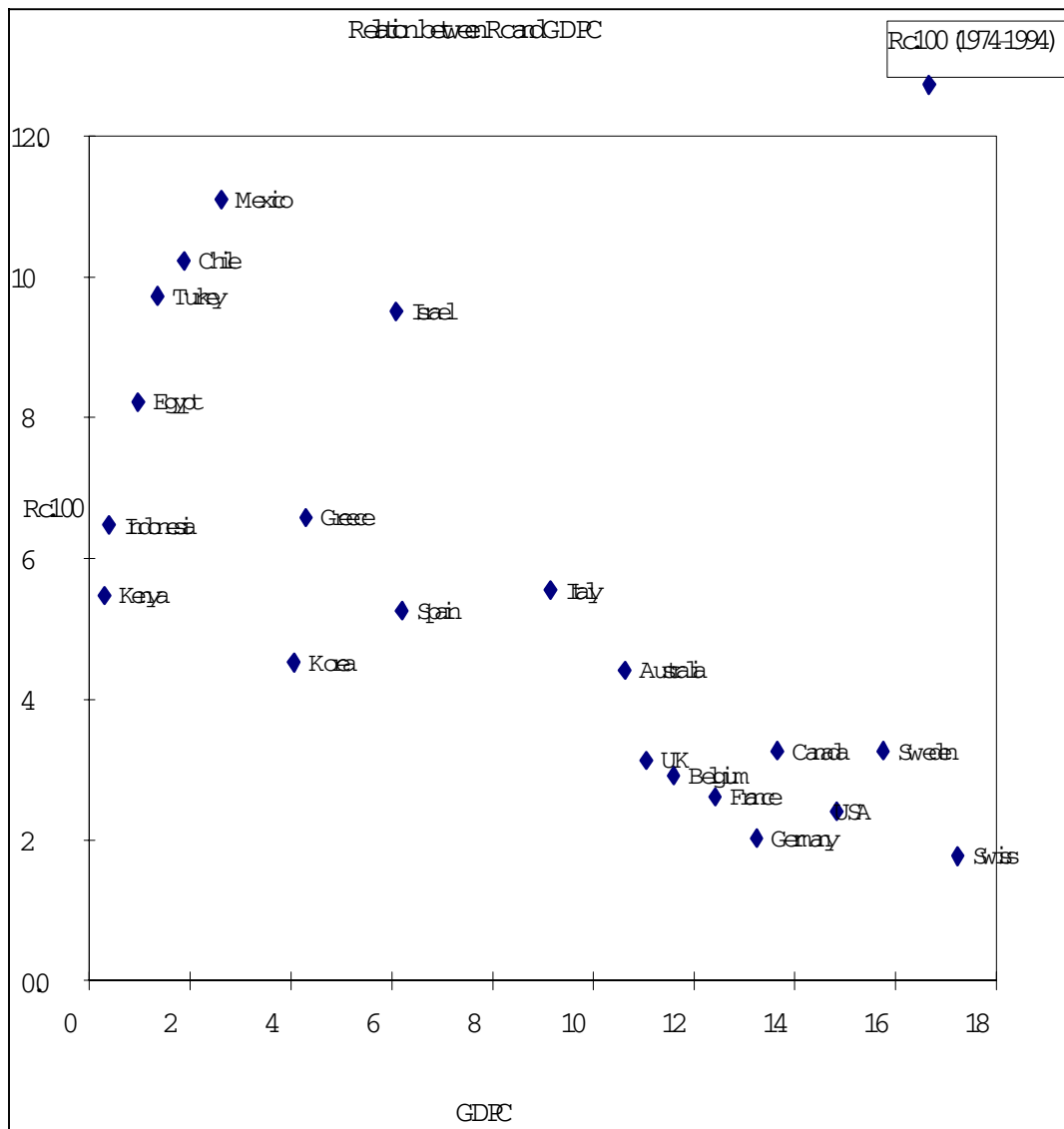
The relation of R_{cj} to the level of development proxies by GNPC is illustrated by the scatter diagram in FIGURE 3. It can be seen that developing and developed countries distinction still exists among countries (with high GNP per capita and relatively low rent-seeking for developed countries, and with low GNP per capita and high rent-seeking for developing countries). Clearly, it can be commented on that developed countries like UK with fixed power structures shows less evidence of waste than many developing countries, like Turkey. As also can be seen, there is a tendency for developing countries to congregate in the upper left hand side of the scatter diagram and for developed countries to on the lower right hand side.

In order to emphasise this difference better I carried out a simple analysis. By taking average rent-seeking and standard deviations of Demirbas's study, I intend to show how waste is comparatively higher in developing countries. If I classify developed countries as; Australia, Canada, Belgium, France Germany, Spain, Italy, Sweden, Switzerland, UK and USA, and developing countries as; Chile, Egypt, Indonesia, Israel, Kenya, Korea, Mexico, Greece and Turkey, I can get these results:

TABLE.4.   Average Rent-Seeking and Standard Deviation of Demirbas's Study

Countries	Average Rent-seeking		Standard Deviation	
	R_{cj}	W_{cj}	R_{cj}	W_{cj}
Developed Countries	2.73	0.89	0.84	0.48
Developing Countries	7.71	2.46	2.34	1.34

I can apply a test statistic to see if the mean value for developing countries is really higher than developed countries' mean value or not.

I can test our null hypotheses that the mean of population of developing countries is equal to the mean of population of developed countries or smaller than the mean of population of developing countries. To conduct the test, I select a sample for developed countries as 12 and for developing countries as 8. When our sample sizes are small (less than 30) and I assume both populations are normally distributed, the test statistic has approximately a t-distribution with the degrees of freedom.

Since the mean value for developed countries, m_{DC}, is 2.73 and the mean value for developing countries, m_{LDC}, is 7.71; and the standard deviation for developed countries, d_{DC}, is 0.84 and the standard deviation for developing countries, d_{LDC}, is 2.34, the test statistic value can be calculated as 4.49.

This value is a realisation of random variable approximately following a t-distribution with degree of freedom is 8.24.

I round downward from 8.24 and use the approximation df = 8. The critical point in a one-tailed test with a = 0.05 for a t-distribution with df = 5 is 1.86. Then, I reject the null hypothesis that the mean values of two populations are equal to each other. In other words the mean value for developing countries is greater than for developed countries.

3.2.1. Two Cross Section Studies for 20 Countries

Following Katz and Rosenberg's argument, I also apply very simple analysis in order to examine rent-seeking in both developed and developing countries. Our intention is to see if there is any relationship beaten quantitative measures of the 'proneness' of different countries to respond to pressure groups in determining the composition of their spending and their GNPC. Although these measures are only indicative rather than conclusive, I believe that they provide some means of comparing the extent of rent-seeking across countries. The hypothesis is that the higher national per capita income (as a proxy to development level) the less rent-seeking will occur. It means that optimal government transfers, better institutional development, well protected property rights etc. reduce rent-seeking activities. To test the hypothesis I used Katz and Rosenberg's idea for 20 countries, but this time for the period 1974-1994. To do that, I estimate a regression equation of waste as a percentage of the budget (R_c) on the GNP per capita (GNPC $_c$) for 20 countries. This regression takes the form :

$$R_{cj} = a + b\,GNPC_{cj} + e_{cj} \tag{4}$$

a)   Katz and Rosenberg's cross section results (1989) for 20 countries for the period 1970-1985

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Katz and Rosenberg estimated this linear regression of waste as a percentage of the budget (R_{cj}) on GNP per capita ($GNPC_{cj}$) for 20 countries and their result yielded as following:

$$\hat{R}_{cj} = \underset{(11.24)}{7.65} - \underset{(5.35)}{0.44} GNPC_{cj} \qquad\qquad R^2 = 0.61 \qquad\qquad (5)$$

The values in parentheses are t-values. They found that one unit an increase in $GNPC_{cj}$ leads to a 0.44 unit decrease in rent-seeking. The sign is as expected and coefficients are statistically significant.

b)   Demirbas's cross section results for 20 countries for the period 1974–1994:

This linear regression of waste as a percentage of the budget (R_{cj}) on GNP per capita ($GNPC_{cj}$) for 20 countries yielded the following result in our estimation:

$$\hat{R}_{cj} = \underset{(8.88)}{8.22} - \underset{(-3.76)}{0.31} GNPC_{cj} \qquad\qquad R^2 = 0.44 \qquad\qquad (6)$$

The values in parentheses are t-values. I find that one unit an increase in $GNPC_{cj}$ leads to a 0.31 unit decrease in rent-seeking waste as a percentage of the budget. I can see this relation in equation (9) for both developed and developing countries in FIGURE 5. Diamond dots are for actual values, square dots are for predicted values.

FIGURE 5   Relationship between R_{cj} and $GNPC_{cj}$ for 20 countries in

                          DEMIRBAS's study

Relationship between GNPC and Rc
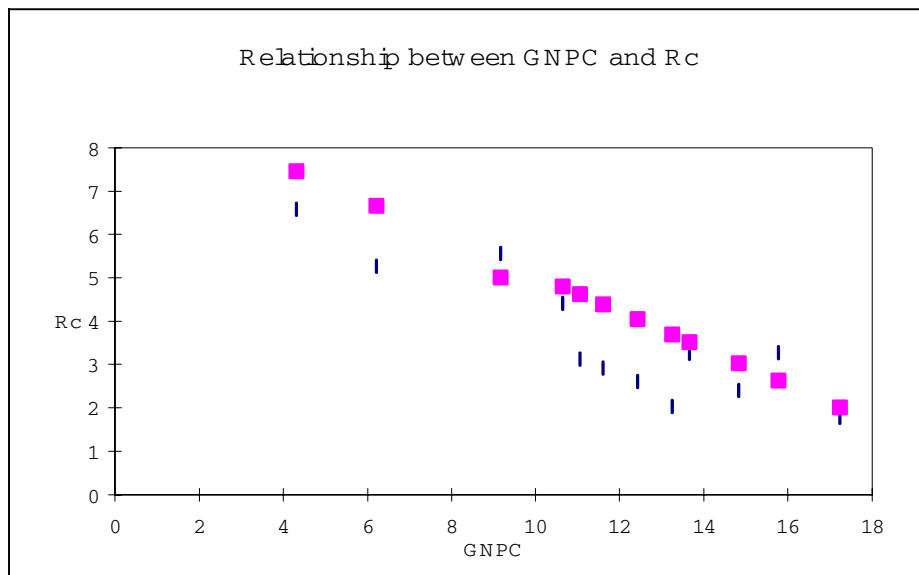
I now carry out a significance test on the slope parameters b, on equation (5), and on equation (6), in order to see if means are significantly different or not at 5%. Our null hypothesis is that means values for each equation are the same and our alternative equation is that they are significantly different. For these hypothesis, since the sample size is small ($n = 20$) the test statistic value is used and it will be -5.21.

Since $\bar{x}_5$ is -0.44 and $\bar{x}_6$ is -0.31, and standard errors are calculated as 0.08 for each equations, the computed value of the test statistic is $t = -5.21$, which is smaller than the critical value -1.73 in a two-tailed test with $a = 0.05$ for a t-distribution. Therefore, I reject the null hypothesis that mean values for equation (5) and for equation (6) are significantly different.

When I estimate the same regression equation for developed and developing countries separately, I obtain:

* For developed countries (1974-1994).

$$\hat{R}_{cj} = \underset{(3.88)}{9.29} - \underset{(-2.17)}{0.42}\,GNPC_{cj} \qquad\qquad\qquad (7)$$

$$R^2 = 0.62, \overline{R}^2 = 0.55$$

Values in parenthesis are t-values. At 5 % significance level the critical t-value is –2.23 I conclude that I cannot reject the null hypothesis that there is no significant relationship beaten the variables at 5 % significance level, but there is a significant relation at 10 % significance level. The sign of coefficient is as expected.

*   For developing countries (1974-1994).;

$$\hat{R}_{cj} = \underset{(4.65)}{7.10} + \underset{(1.27)}{0.69}\,GNPC_{cj} \qquad\qquad\qquad (8)$$

$$R^2 = 0.61, \overline{R}^2 = 0.58$$

The values in parenthesis are t-values. At the 5% significance level the critical t-value is 2.09. So I cannot reject null hypothesis that there is no relationship beaten variables. There is a no significant relation even at 10 % significance level

As can be seen from our analysis, although I found out that there is a significant relationship beaten rent-seeking and GNP per capita for 20 countries, the same regression equation did not give the same answer when I separated countries into developed and developing ones.

I now carry out a significance test on the slope parameters in equation (7) (which is –0.42), and equation (8) (which is 0.69) in order to see if they are significantly different. Our null hypothesis is that there is no significant relationship.

For these hypothesis, since the sample size is small (n = 20) the test statistic value will be –1.94.

Since $\bar{x}_7$ is –0.42 and $\bar{x}_8$ is 0.69, and standard errors are calculated as 0.08 for each equations, the computed value of the test statistic is t= –1.94, which is smaller than the critical points –1.73 in a two-tailed test with a = 0.05 for a t-distribution. Therefore, I reject the null hypothesis. In other words, the mean values for equation (7) and for equation (8) are significantly different.

Therefore, I conclude that cross section studies might not be the best method for measuring rent-seeking when developed and developing countries' distinction is the case in consideration. In order to eliminate these shortcomings of the cross section study, I apply time series study for Turkey with more explanatory variables. In order to apply a time series technique I need to explain very briefly the methodology of this study.

4.   A Time Series Study For Turkey

In the previous section, I applied cross section analysis for testing budgetary rent-seeking for 20 countries and concluded that budgetary rent-seeking will decrease with an increase in the level of development as proxies by GNP Per Capita. In addition, I also found that Turkish rent-seeking for budgetary allocation as a percentage of GNP, W_{cj}, decreased and it moved to 14th place from 15th place in Demirbas's Ranking Correlation Table, (TABLE 2). I consider that although cross section analysis give some interesting results, it still far from being very comprehensive and analytical. In the analysis, all 20 countries are assumed to have similar political systems even in developing and developed economies distinction is mentioned. Indeed, each country has different institutional background and structure. Since different institutional settings lead to different levels of rent-seeking, the actual consequences of changes in the discretionary power of political agents can be examined in time-series approach. In order to examine institutional issue in Turkey in the context of rent-seeking, I applied time series study. Therefore, I will examine the hypotheses that if there is any long-run relationship between variables in cointegration/Error Correction Mechanism framework.

4.1. Cointegration Tests

The concept of cointegration was first introduced into the literature by Granger in 1981. Cointegration is the statistical implication of the existence of a long-run relationship between economic variables (Thomas, 1993). The main idea behind cointegration is that if, in the long-run, two or more series move closely together, even though the series themselves are trended, the difference between them is constant. It is possible to regard these series as defining a long-run equilibrium relationship, as the difference between them is stationary (Hall and Henry, 1989).

Charemza and Deadman (1992:144) defined cointegration as:

> Time series x_t and y_t are said to be cointegrated of order d,b where $d \geq b \geq 0$, written as;
>
> $$x_t, y_t \sim CI(d,b),$$
>
> if:
> 1. both series are integrated[4] of order d,
> 2. there exists a linear combination of these variables, say $a_1 x_t + a_2 y_t$, which is integrated of order d-b

According to this definition, $[a_1, a_2]$ is called a cointegrating vector. Cointegrating coefficients, which constitute the cointegrating vector, can be identified with parameters in the long-run relationship between the variables. In the case of cointegration, if these variables are cointegrated, they cannot move 'too far' away from each other. In contrast, a lack of cointegration suggests that such variables have no long-run relationship (Dickey et.al, 1991).

The order of integration of the variables is one very important topic related to cointegration. In the literature, much of the theory of cointegration has been developed for the case where all series are integrated of order one, i.e. are I(1). It must be stressed that if variables in a long run relationship are of different orders of integration and the order of integration of a dependent variable is lower than the highest order of integration of the explanatory variables, there must be at least two

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[4] Integration is the representation of a process as a sum of past shocks. A process is said to be integrated of order d ((I(d)) if after differencing d times the resulting process is stationary (denoted I(0))

explanatory variables integrated of this highest order if the necessary conditions for stationary of the error term is to be met.

There are three notions behind cointegration to be mentioned here; spurious correlation, stationary[5] time series and error correction modelling (ECM). According to Granger and Newbold (1974), spurious regressions are typically characterised by a very low Durbin-Watson statistic[6]. If there is a high degree of correlation between two variables, it does not automatically imply the existence of a casual relationship between the variables concerned (Holden and Thomson, 1992). For example, a high R^2 may only indicate correlated trends and a not true economic relationship (Miller, 1991). To remedy this problem, the cointegration technique and error correction modelling are recommended (Bahmani-Oskooee and Alse, 1993).

Cointegration analysis confronts spurious regression, attempting to identify conditions under which the regression relationship is not spurious. Therefore, the problem of spurious regression, and the resulting work on cointegration, occurs because most economic time series are non-stationary. A stochastic process is said to be stationary, if the mean, variance and covariance of a series to remain constant over time. If one or more of the conditions are not satisfied, the process is nonstationary (Charemza and Deadman, 1992; Thomas, 1993). Cointegration and error correction modelling involves main three steps. First, determine the orders of integration for each of the variables; that is, difference each series successively until stationary series emerge. Second, attempt to estimate cointegration regressions with ordinary least squares, using variables with the same order of integration (in the two variable case).Finally, if there is a cointegrating relationship between the variables, construct the error correction model.

4.1.1   Unit Root Test for Order of Integration

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[5] Stationarity of a series implies that graphs of a realisation of a time series over two equal-length time intervals should exhibit similar statistical characteristics. Stationary series have a tendency to return to their original value after a random shock; the mean and the variance of such a series do not change with the passage of time.

[6] "Spurious regression problems may exist when the adjusted R^2 is higher than the DW statistic; under such circumstances the coefficient estimates are problematic" (Miller, 1988:31-32)

Since standard regression analysis requires that data series be stationary, the first step is to identify the order of integration of each of the variables. Therefore, I apply the unit root test. Although there are several tests for the presence of unit roots in time series data, the standard testing procedure for determining the order of integration of a time series is the Augmented Dickey-Fuller (ADF) test (Dickey and Fuller, 1979, 1981). The general form of ADF test in levels and in first differences can be written as follows;

$$\Delta y_T = a + dy_{T-1} + \sum_{i=1}^{m} b_i \Delta y_{T-i} + j\ T + e_T \qquad \text{(for levels)} \qquad (9)$$

$$\Delta \Delta y_T = a + d\Delta y_{T-1} + \sum_{i=1}^{m} b_i \Delta \Delta y_{T-i} + j\ T + e_T \quad \text{(for first differences} \quad (10)$$

where, Δy_t are the first differences of the series, m is the number of lags and t is time. I regress Δy_t on a constant, y_{t-1}, Δy_{t-i} (several lags of Δy_t (enough to avoid autocorrelated disturbances)) and T (a time trend). Then the t-statistic on the estimated coefficient of d is used to test the following null and alternative hypotheses. In the ADF test, "the null hypothesis is that the variable under investigation has a unit root, against the alternative that has not. The substantially negative values of the reported test statistic lead to rejection of the null hypothesis" (Dickey et al., 1991:72).

$$H_O: d = 0 \qquad \text{(i.e. the presence of a unit root in the series levels)} \qquad (11.)$$

$$H_1: d < 0$$

My aim is to test the null hypothesis of noncointegration against the alternative of cointegration and then to estimate the cointegrating regression. If the hypotheses of the presence of a unit root Ire not rejected one would then the test the differences for the presence of a second unit root. If the unit root is set out as above cannot be rejected then y_t cannot be stationary and it may be I(1) or I(2), or have an even higher

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order of integration [see for more details, Fueller (1976); Engle and Yoo (1987), Cheramza and Deadman (1997)].

Since I do not know the true order of d, when I used two-step procedure, the model selection criteria such as the Akaike Information Criteria (AIC) or the Schwarz Bayesian Criteria (SCB) can be used to select the order of the ADF regression. To do that I select three lags, then choose the highest AIC to decide which lag I will apply.

The rejection of the no-cointegration hypothesis shows that the proposed relationship is a valid cointegrating vector which makes the regression of budgetary rent-seeking on the variables are non-spurious. Existence of cointegration means that budgetary rent-seeking and the other variables tend to move together. Following the recent literature the link between cointegration and the error correction are explored by the two step procedure (Engle and Granger (1987). The first stage is simply to estimate the static cointegrating (OLS) regression, the second is to estimate the error correction model. The equation to be estimated is as follow ;

4.2.   Time series study for Turkey with Additional Variables (1960-1994)

I analyse Turkey since it is very interesting country from the viewpoint of the institutions.   The state can be classified as a 'strong state', which are "those simultaneously capable of resisting pressures and generating public policy initiatives on their own" (Caporaso and Levine, 1993:183). On the other hand, the interest groups are weak and unorganised. In the case that the state is strong, the budget will also represent the policy initiatives of the state (the civil and military bureaucrats).

In this section, in order to analyse Turkish case in more detail, I carry out time series analysis in which government size and few dummy variables are added to the equation. My hypothesis is that the smaller the government size and the higher is GNP per capita income, then I have less rent-seeking in the economy.

The size of government and rent-seeking relation has been explored by Tullock (1965), Downs (1967) and Niskanen (1971). In the mainstream public choice literature, while

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Buchanan and Tullock (1962) advanced the central idea that strong interest groups determine the size of the government, Niskanen (1971) has argued that the bureaucracy contributed to the size of government with oversupply hypothesis. Indeed, I can combine these two approaches by claiming that both interest groups and bureaucracy determine and contribute to the size of government together simultaneously. When rent-seeking costs arise from politico-economic models based on the size and the growth of government, I can employ the size of government variable as explanatory variables to explain rent-seeking activities. It is true that both "bureaucracy growth and rent-seeking reflect government failure; while bureaucrats as agent provocateurs may induce rent-seeking politicians aware of their re-election constraint" (McNutt, 1996:136). Therefore, I expect a positive relationship between rent-seeking measure LnR_t and government size $LnGY_t$.

On the other hand, the higher the per capita income the lower the emphasis on the need for government transfers. Simply at higher income levels, the margin of interest group competition is likely to be exercised in the market place. However, when the income is low, political allocation yields higher income benefits through transfers relative to the income derived from the market. In other words, it is more profitable for interest groups to invest their scarce resources to influence government policy than it is for them to invest their scarce resources in the market where the returns are low. The competition to control the instruments of wealth transfers is therefore likely to be more vigorous in low income countries than in high income countries. In sum, the lower the per capita income (GNPC) the higher the political instability and the lower degree of political competition because the ruling coalition always seeks to monopolise the supply of legislation and to dissipate its transfers to the members of the supporting coalition. I therefore expect a negative relationship between the level of per capita income and rent-seeking. In order to capture this relationship I set two models. In the first model I exclude dummy variables effects and in the second I add dummies.

Model 1

$$LnR_t = a + bLnGNPC_t + jLnGY_t + cD71 + e_t \qquad\qquad (12.)$$

Model 2

$$LnR_t = a + bLnGNPC_t + jLnGY_t + cD71 + dD74 + lD80 + e_t \qquad (13.)$$

Here, I took the natural log of the variables since this linear form can also give us some information about elasticity.

In where;

LnR_t :   The logarithm of rent-seeking (1960-1994 in current prices, from IMF resources)

$LnGNPC_t$:   The logarithm of GNP per capita (1960-1994 in current prices, from IMF resources)

$LnGY_t$:   The logarithm of government size (G/GNP) (1960-1994), from IMF resources)

D71:   dummy for 1971 military intervention

D74:   dummy for Cyprus conflict in 1974

D80:   dummy for 1980 military intervention

TABLE 6   The ADF Test for Integration Level

Variables.	Levels		1st Differences		
	ADF	CV	ADF	CV	Integer Levels
LnR$_t$	-0.60	-2.95	-7.32	-2.95	I(1)
LnGNPC$_t$	-0.06	-2.95	-6.67	-2.95	I(1)
LnGY$_t$	-0.54	-3.55	-6.68	-3.56	I(1)

The results in TABLE 6 suggest that all the variables appear to be stationary in their first differences. On the basis of this information, I can now estimate the Engle–Granger cointegration test first stage estimation.

4.2.1. The Engle-Granger First Stage (Long Run) Estimation for Turkey, 1960–1994

In this section I estimated two Models in order to find out long-run relationship between variables. TABLE 7 presents these results.

TABLE 7.   Dependent Variable is LnR_t

Regress	Model 1	Model 2
A	-1.60	-0.76
	(-2.50)	(-1.86)
$LnGNPC_t$	-0.29	-0.47
	(-1.00)	(-2.19)
$LnGY_t$	0.89	0.77
	(10.01)	(8.67)
D71	————	1.95
		(2.91)
D74	————	1.21
		(1.72)
D80	————	1.21
		(1.74)
R^2	0.91	0.94
$\overline{R}^2$	0.90	0.93
DW	1.43	1.72
F-Statistic	162.83	92.08
SC	1.68	0.04
FF	2.97	2.19
N	1.01	0.27
H	0.00	0.16
ADF	-4.48	-5.59
ADF CV 5%	-4.00	-4.00

The values in parentheses are t-values

Since calculated ADF values are more negative than the critical values I can now claim that a cointegrating relationship exists between variables. What I mean with cointegrated relationship between my variables is that there is a long-run relationship between budgetary rent-seeking (LnR_t) and GNP per capita ($LnGNPC_t$) and Government Size ($LnGY_t$).

Now I proceed to its second stage of the Engle-Granger estimation, i.e. I estimate an ECM model.

4.2.2. Error Correction Mechanism (ECM) for Turkey

According to Engle Granger (1987), if there is a cointegrating relationship between variables, there is a long-run relationship between them. Furthermore, the short-run dynamics can be described by the error correction model (ECM). This is known as the Granger representation theorem.

If:

$x_t \sim I(1)$, $y_t \sim I(1)$, and Error Correction Term, $ECT = y_t - b \ x_t$ is $I(0)$, then x and y are said to be cointegrated (Maddala, 1992:597). The Granger representation theorem implies that under these circumstances x_t and y_t may be considered to be generated by ECM of the form :

$$\Delta y_t = a + b \ ECT_{t-1} + d \ \Delta x_t + e_t \qquad (14.)$$

where b is nonzero and e_t is white-noise errors. After I found out that my set of variables are cointegrated, then I can apply error-correction modelling to describe the short run dynamics. Engle and Granger argue that a simple way to estimate Error Correction Mechanism (ECM) for the dependent variable and to test the statistical significance of the error-correction term is to use a traditional t-test. A negative sign and a significant value for b $(|b| < 1)$ shows that adjustment is made towards restoring the long-run relationship. Below I present two equations for Model 1 and Model 2 in order to estimate whether short run adjustments are guided by and consistent with the long-run equilibrium or not for the case of rent-seeking, government size and income per capita. These models are as follows:

Model 1

$$\Delta \text{LnR}_t = a_1 + b_1 \text{ECT}_{1t-1} + d_1 \Delta \text{LnGNPC}_t + j_1 \Delta \text{LnGY}_t + e_{1t} \tag{15}$$

Model 2

$$\Delta \text{LnR}_t = a_2 + b_2 \text{ECT}_{2t-1} + d_2 \Delta \text{LnGNPC}_t + f_2 \Delta \text{LnGY}_t + s_2 \Delta D71 + y_2 \Delta D74$$
$$+ q_2 \Delta D80 + e_{2t}$$
$$\tag{16}$$

The ECM results can be seen from TABLE 8.:

TABLE 8   ECM (Error Correction Mechanism) for Model 1

Dependent Variable is ΔLnR_t			
34 observations used for estimation from 1961 to 1990			
Regress	Coefficient	Standard Error	T-Ratio [Prob.]
A	0.07	0.15	0.50 [0.62]
ECM (-1)	-0.80	0.20	-4.02 [0.00]
ΔLnGNPC	-1.16	0.77	-1.50 [0.14]
ΔLnGY	0.28	0.32	0.87 [0.40]
$R^2 = 0.35$ $\overline{R}^2 = 0.29$		DW = 1.71 F-Statistic = 5.60 [0.00]	
Diagnostic Tests			

Test Statistic	LM Version
Serial Correlation	3.92
Functional Form	1.32
Normality	0.76
Heteroscedasticity	0.08

TABLE 9   ECM (Error Correction Mechanism) for Model 2

Dependent Variable is ΔLnR_t

33 observations used for estimation from 1962 to 1994

Regress	Coefficient	Standard Error	T-Ratio [Prob.]
A	0.14	0.16	0.90 [0.37]
ECM (-1)	-0.91	0.21	-4.25 [0.00]
ΔLnGNPC	-1.02	0.66	-1.55 [0.13]
ΔLnGY	0.46	0.33	1.39 [0.17]
ΔD71	1.34	0.44	3.06 [0.00]
ΔD80	0.74	0.42	1.79 [0.09]
ΔD74	1.52	0.41	3.68 [0.00]

$R^2 = 0.59$ $\overline{R}^2 = 0.50$ DW = 1.61   F-Statistic = 6.57 [0.00]

Diagnostic Tests

Test Statistic	LM Version
Serial Correlation	4.77
Functional Form	0.69
Normality	0.67
Heteroscedasticity	0.65

In both models, the coefficients on the ECMs are negative and significant. This means that adjustment is made towards the long-run relationship. In Model 1, the ECM coefficient is -0.80 and in Model 2, it is -0.91 by suggesting very rapid adjustments. Short-run adjustments are therefore guided by, and consistent with the long-run equilibrium relationship between variables for both models. However, in both Model 1 and Model 2 apart from dummy variables, ΔLnGNPC and ΔLnGY Ire found to be statistically insignificant at 5% and 10% percent levels.

5.   Conclusion

In this paper, I have analysed rent-seeking waste arising for government budgetary allocations, following a method suggested by Katz and Rosenberg. I also examined

Turkey in time series framework in order to understand developing countries rent-seeking structure much better.

First of all, I would like to emphasise that my findings support Katz and Rosenberg's result. Hence, their distinction between developed and developing countries still exists. Whilst governments in both developed and developing countries stimulate rent-seeking, and transfer resources from society to few privileged groups (interest groups), rent-seeking in developing countries is much grater than in developed countries.

Secondly, in my additional work for Turkey, I found that there is a cointegrating relationship between rent-seeking as a percentage of the budget LnR_t and government size ($LnGY_t$), and GNP per capita income ($LnGNPC_t$) in Model 1. I also found that there is a cointegrated relationship between rent-seeking as a percentage of the budget LnR_t and government size ($LnGY_t$), and GNP per capita income ($LnGNPC_t$) and three dummy variables, which are D71 (for military intervention), D74 (for Cyprus conflict) and D80 (for military intervention) in Model 2. Among them I selected Model 2. In other words independent variables help to explain rent-seeking waste in Turkey during the period 1960-1994. In addition to these cointegrated relationships, I should that adjustments are made towards restoring the long run relationship between rent-seeking and other variables. However, in Model 2, two military interventions and the Cyprus conflict in 1974 had more power to explain rent-seeking behaviour in the long run than Model 1. This also supports my argument that some interest groups such as the military and the bureaucracy in Turkey, have very distinctive power upon governments in order to extort resources for themselves.

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