THE EFFECT OF POLITICAL BUSINESS CYCLES ON STRUCTURAL CHANGE

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THE EFFECT OF POLITICAL BUSINESS CYCLES ON STRUCTURAL CHANGE

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ABSTRACT

The Effect of Political Business Cycles on Structural Change

This research provides evidence of political business cycles in Turkey between the 1960s and 2020s. Several political color dummy variables are employed with different dependent variables. While a shift from right-wing party to left-wing party increases the growth of academic freedom and spending of the ministry of culture and health, it lowers military expenditure and spending on religious affairs. However, if the government is formed as a coalition with several parties, it creates an increase in the growth of the transfer expenditure. Then we questioned the impact of the cycle on the total factor productivity and reallocation of labor from low-productivity sector to high- productivity ones. The results of structural change-related models indicate a shift toward the left-wing party increases total factor productivity and between component of labor productivity in the industry, but it lowers the agricultural employment and between component of agriculture. While structural models indicate the presence of an effect, not all of the VAR models do.

ÖZET

Politik İş Çevrimlerinin Yapısal Değişiklikler Üzerine Etkisi

Bu araştırma, Türkiye'de 1960'lar ve 2020 arasındaki politik iş çevrimlerinin var olduğunu göstermektedir. Farklı bağımlı değişkenlerle birlikte çeşitli siyasi politik kukla değişkenler kullanılmaktadır. Hükümette sağ parti yönetiminden sol partiye geçiş, akademik özgürlüğü, kültür ve sağlık bakanlığının harcamalarını artırırken, askeri harcamaları ve din işlerine yapılan harcamaları azaltmaktadır. Ayrıca, hükümetin birkaç parti ile koalisyon halinde kurulması transfer harcamalarında bir artış yaratmaktadır. Bununla birlikte, politik iş çevrimlerinin toplam faktör verimliliği üzerindeki etkisini ve emeğin düşük verimli sektörden yüksek verimli sektörlere yeniden tahsisini sorguladık. Yapısal değişimle ilgili regresyon sonuçları, sol partiye doğru bir kaymanın toplam faktör verimliliğini ve sanayide emek verimliliğinin bileşenler arasındaki parçasını artırdığını, ancak tarımsal istihdamı ve tarımdaki emek verimliliğinin bileşenler arasındaki parçasını azalttığını göstermektedir. Yapısal modeller bir etkinin varlığını gösterirken, VAR modellerinin tümü bunu göstermemektedir.

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ABBREVIATIONS

ADF	Augmented Dickey Fuller
DPI	Database of Political Institutions
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
IRF	Impulse Response Functions
OLS	Ordinary Least Squares
PBC	Political Business Cycles
PWT	Penn World Tables
RPP	Republican People's Party
TFP	Total Factor Productivity
VAR	Vector Auto Regression

CHAPTER 1

INTRODUCTION

First introduced by Nordhaus (1975), many researches have been conducted on political business cycles. It simply corresponds to the manipulation of the policy tools by the incumbent party, which induces a fluctuation in the economy. The motivation behind the manipulation emerged from re-election purposes or different policy objectives of parties; the former is called opportunistic political business cycles, while the latter is called partisan political business cycles.

The effect of the political business cycles on the economy is commonly expected to be short, but prolonged and repetitive manipulations of policy tools with different purposes might produce a long-run effect, i.e., impress the country's development process. To be more precise, PBC can affect the process of the movement of reallocation of labor from the low-productivity sector to the high-productivity sector, which is expressed as structural change Rodrik (2013).

Two possible mechanisms are envisioned as direct and indirect. The direct mechanism suggests that if an incumbent party did not increase its spending for re-election or different policy objectives and instead increased its investments, the country's development level would be higher. The indirect one is through real business cycles. The indirect effect spreads as follows: political-induced nominal shocks cause economic fluctuations, which can accelerate or slow down the structural change.

As a developing country, Turkey has experienced both short-lived coalition governments and long-standing majority governments such as Democrat Party, Motherland Party, Justice and Development Party, etc., after the transition to a multi-party system. Even though both types of government comprise shortcomings in terms of controlling policy tools, it is foreseen majority governments can manipulate more accessible monetary and budget policy tools Aray (2016).

In this research, whether the existence of both opportunistic and partisan political cycles or not will be examined, then the possible effect of political cycles on structural change will be questioned. In the second chapter, I will mention the related literature. Then, the data and methodology will take place in the third part. The fourth part will be the analysis, and I will try to profoundly show the effect of political business cycles on structural change with several methods. In the last part, I will represent a conclusion of the complete analysis.

CHAPTER 2

LITERATURE REVIEW

The question of this research requires the literature review to consist of more than one different topic. As a first step, fundamental papers on the PBC were generally reviewed and then narrowed for Turkey. Secondly, structural change related articles have been chased.

Nordhaus (1975) is formed the first model of the opportunistic political business cycles by utilizing the Phillips curve, and the model is based on backward-looking and short-sighted voters and implies recession after election, expansion before election. Hibbs (1977) introduced partisan political business cycles and stated that left-wing and right-wing parties have different policy objectives. At the same time, high inflation is not a problem for left-wing parties; low unemployment does not disturb right-wing parties. Alesina, Mirrlees, and Neumann (1989) added rational voters to the partisan theory.

More generally, Tufte (1978) shows that parties of the right prefer low taxes, low inflation, and balanced budgets; they oppose equalization. On the other hand, parties of the left favor equalization, low unemployment, and larger budgets with less emphasis on the budget balance. Cusack, Notermans, and Rein (1989) points out strong partisan effects on public employment, such as left-wing parties preferring to have a larger government size. Schulze and Rose (1998) investigates the cultural expenditure of parties and concludes that conservative and liberal politicians tend to support classical orchestras more than Social Democratic and Green politicians do. Busemeyer (2009) demonstrates that social democratic parties have mainly followed a strategy of increased investment in public higher education, associated with an expansion of university enrollment.

There are also many papers on the existence of both opportunistic and partisan political business cycles in Turkey. Ergun (2000) indicated the presence of the political business cycles for Turkey with both monetary and fiscal variables by

employing monthly data. This research is the first one that employed monthly data for Turkey. Köksal and Çalışkan (2012) questioned the existence of both opportunistic and partisan cycles by using stock market data, and the conclusion is permanent partisan effects in the conditional variance but not in returns. Davut and Tarkan (2018) investigated the impact of the elections on the composition of public expenditure between 1965-2004 and found that general and local elections influence the composition of public spending in Turkey, such as current and transfer expenditures increases before the general election. However, investment and transfer expenditures boost during the local election period. On the other hand, Eryılmaz and Murat (2016) demonstrated the non-existence of opportunistic political business cycles with the variables GDP, inflation, money in circulation, and money supply.

Karagöl and Turhan (2008) shows the partisan effect on the defense expenditure. Akçoroğlu and Yurdakul (2004) points out that while budget deficit increases in the election year, inflation and economic growth are not affected by elections. Also, their results show no clear partisanship of different parties in Turkey. Sayan and Berument (1997) studied the effect of left-right parties and whether the government was established by coup or not on the macroeconomic outcomes and resulted in a government that comes after military intervention follows populist economic policies.

On the structural change side, Acemoglu and Guerrieri (2008) is one of the fundamental papers illustrating the two-sector model. The model is based on two forces; capital deepening raises the relative output of the sector with a greater capital share and causes a reallocation of capital and labor away from that sector. Kongsamut, Rebelo, and Xie (2001) indicates that the reallocation of labor from agriculture to manufacturing and services is inconsistent with the balanced growth path defined over the Kaldor facts.

The growth process of Turkey has been nicely summarized in Altuğ, Filiztekin, and Pamuk (2008). They display output growth in Turkey is primarily due to capital accumulation, not total factor productivity growth. Atiyas and Bakış (2014)

and Atiyas and Bakış (2020) undertake a growth accounting exercise for the Turkish economy. They display the 2000s were unique because this was the only decade since the 1970s where TFP growth in agriculture was positive and higher than industry and services. Bakış and Acar (2020) calculated the sectoral TFP of four primary sectors of Turkey (agriculture, industry, services, and construction) between 1980 and 2018. The most original contribution of this study is presenting the first TFP analysis for construction. These articles helped in calculating the TFP of Turkey.

The last part of the literature review consists of the determinants of the TFP and structural change. Isaksson (2007) provides an excellent literature review on the possible determinants of total factor productivity. He grouped all determinants under four headings; creation, transmission, and absorption of knowledge; factor supply and efficient allocation; institutions, integration, and invariants; and competition, social dimension, and environment. Aray (2016) questioned the possible partisan alignments effect on TFP in Spain and results indicate if the central government is majority then partisan alignment effects on TFP growth appears. Martins (2019) studied the structural change determinants and concluded that the reallocation of labor from agriculture to industry and services is the primary driver of structural change.

CHAPTER 3

DATA

Throughout the analysis, the effect of political business cycles on structural change has been studied in Turkey between the 1960s and 2020. As a first step, the existence of both partisan and opportunistic cycles has been investigated using yearly data. Secondly, the possible effect of political business cycles on the reallocation of labor from agriculture to industry and services and total factor productivity are analyzed.

3.1 Political color variables

To analyze both partisan and opportunistic cycles are required to create dummy variables. Studies generally depend on dummies such as one before the election and zero otherwise to capture electoral cycles. The number of dummies differences by the frequency of data Ergun (2000), Davut and Tarkan (2018), Ozatay (1999).

On the other hand, investigating partisan cycles are needed the left-right cleavage first. It is pretty challenging for the Turkish case because short-term coalition governments and changing the parties' political positions during their term make the left-right cleavage harder. Therefore, the history of Turkish politics was reviewed from Çarkoğlu (1998) and Sayari (1978) to clarify the left-right score of the parties. Additionally, Potrafke (2009) is utilized to design an ideology index with coalition governments. Presence ones have also benefited, such as left, right, and center dummies from the DPI between 1975 and 2020.

Potrafke (2009) index places the cabinet on a left-right scale with values between one and five. It takes the value of one if the share of governing right-wing parties in terms of seats in the cabinet and parliament is larger than two-thirds and two if it is between one-third and two-thirds. The index is three if the share of center parties is 50% , or if the left-wing and right-wing parties form a coalition government not dominated by one side. The index is symmetric and takes the values four and five if the left-wing parties dominate.

Even though the Portafke ideology index is designed to weight the effect of parties in the coalition government, it does not capture the change in the ideological position of the parties. Çarkoğlu (1998) gave a score upon parties' left-right position between 1950 and 1995 by reading their manifests; it enables to catch changes in parties' ideology. To illustrate, Republican People's Party, a typical center party, behaved as a right-wing party in the 1950s to take votes from Democrat Party's electorate. On the other hand, the RPP transformed itself into a modern left-wing party during the 1960s. Democratic Left Party moves to the right by emphasizing freedom and human rights, economic orthodoxy through savings and thrift, and a smaller and more efficient government. However, the True Path Party moved to the left by emphasizing internationalist, pro-European community, democracy, pro-social services, and pro-education arguments from 1991 to 1995 Çarkoğlu (1998), Sayari (1978).

Figure one indicates the more right-wing emphases on the manifesto, the more party falls to the bottom of the graph; the more left-wing emphases are, the party will rise on the chart. Çarkoğlu ideology index takes values between one-ten according to the number of seats taken by parties in the government. One is extreme right, five is centrist, and ten is extreme left. The index has been scaled according to scores.

Potrafke (2009) and Çarkoğlu (1998) are created to establish a more accurate political color variable of Turkish politics that captures both coalition governments and the changing ideological position of parties. However, other political color variables are also employed by following related literature. LeftKC, Köksal and Çalışkan (2012), is one if there was a left party in the coalition government, and zero otherwise. PolACR is zero if the government is one party majority parliamentary government; one if the coalition parliamentary government has two coalition partners; two if the coalition parliamentary government has three or more coalition partners, and three if the minority parliamentary government Alesina, Cohen, and Roubini (1991).

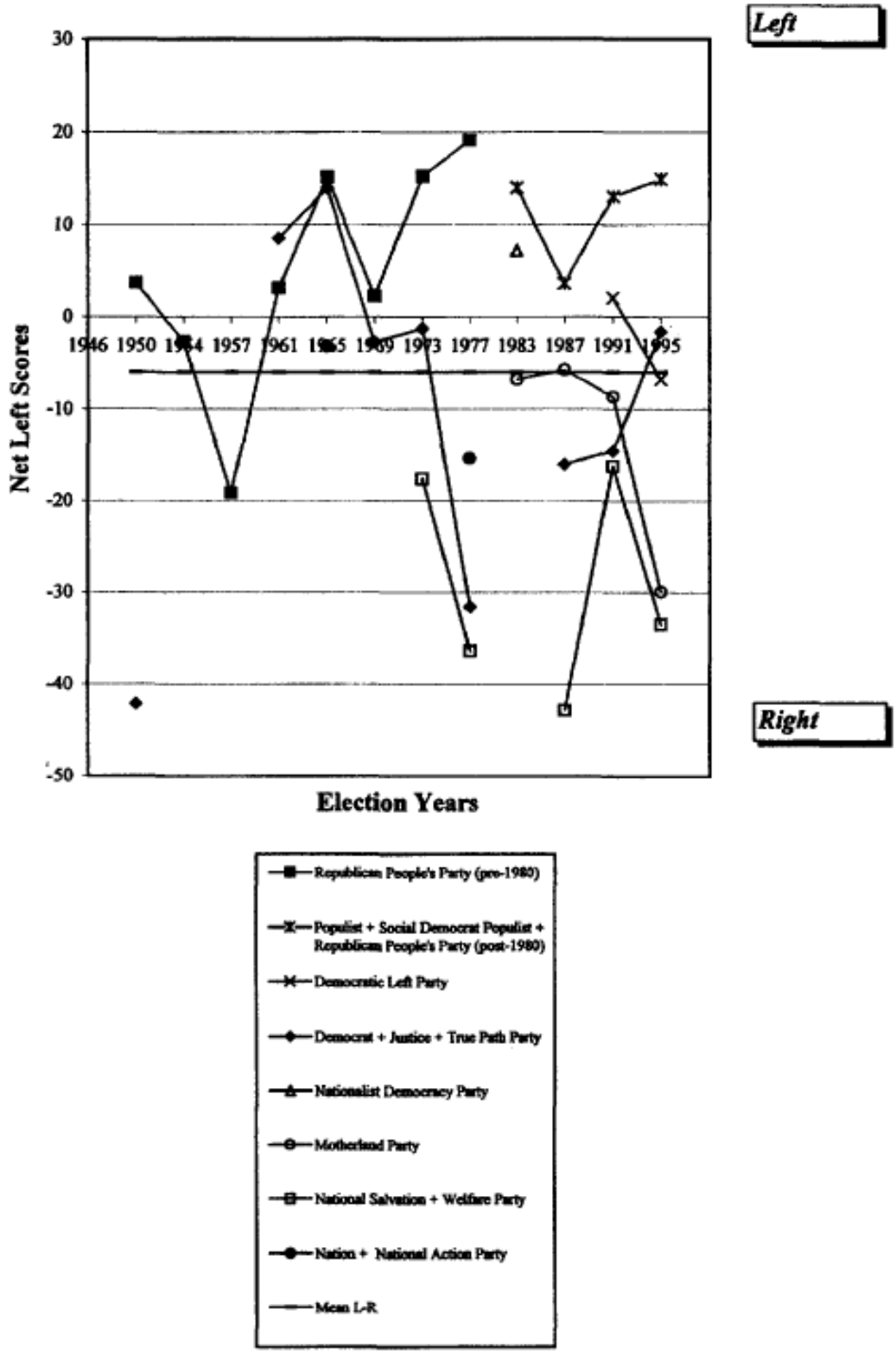


Figure 1. Left-right ideological position of parties, Çarkoğlu (1998).

TSLE refers to the time elapsed since the last election. It implies that the higher the number of quarters, the higher the government's motivation towards manipulating the economy, as higher quarters indicate that election time is approaching Asutay (2004). GovernmentBS originated from the paper that Sayan and Berument (1997) and one if there was a time of military coup d'état, zero otherwise. LeftRodrigues is employed by Sakurai and Menezes-Filho (2011), and it is one if the major party in the coalition is left, zero otherwise. LefRPT is +1 in two years after a change of government toward the left; -1 in two years after the change of government toward the right; 0 otherwise Alesina et al. (1989).

3.2 Existence of political business cycle

Table one displays the descriptive statistics, data sources, and time of the variables that are utilized to analyze the existence of the political business cycles. By the following literature, categories of government expenditures as a percentage of GDP and spending of ministries as a percentage of total budget expenditures are employed as a dependent variable.

Table 1. Descriptive Statistics and Data Sources of PBC

Variables	Obs	Mean	Std. Dev.	Min	Max	Sources	Time Span
Academic Freedom Index	74	.3153243	.1434212	.065	.6	Quality of Government (QoG)	1946-2019
Military expenditure	60	3.296607	.7737765	1.822378	5.119454	World Bank(WDI)	1960-2019
Transfer Expenditures	74	8.861508	8.145331	1.14603	40.39715	Ministry of Treasury and Finance	1946-2019
Religious Affairs	96	.6586289	.3512265	.072631	1.441156	Ministry of Treasury and Finance	1924-2019
Ministry of Culture	86	.3672409	.213317	.0331886	1.369482	Ministry of Treasury and Finance	1934-2019
Ministry of Health	96	3.168728	1.068159	1.282972	5.477103	Ministry of Treasury and Finance	1924-2019
Democracy Index	73	6.082192	3.843297	-5	9	Polity IV	1946-2018
Judicial Corruption Decision	74	2.301514	.3270297	1.732	2.765	Quality of Government (QoG)	1946-2019
Potrafke Ideology Index	76	2.157895	1.143709	0	5	Potrafke (2009)	1946-2020
Çarkoğlu Ideology Index	49	3.881579	2.128957	0	9	Çarkoğlu (1998)	1946-1995
LeftDPI	46	.1086957	.3146964	0	1	DPI	1975-2020
RightDPI	46	.3478261	.4815434	0	1	DPI	1975-2020
Polcontinous	46	.173913	.4855397	0	2	DPI	1975-2020
GovernmentBS	76	.0657895	.249561	0	1	Sayan and Berument (1997)	1946-2021
TSLE	76	2.355263	1.207796	0	5	Asutay (2004)	1946-2021
PolACR	76	.6315789	.9068937	0	3	Alesina et al. (1991)	1946-2021
LeftKÇ	76	.2894737	.4565315	0	1	Köksal and Çalışkan (2012)	1946-2021
LeftRPT	76	-.3157895	.6774565	-1	1	Alesina et al. (1989)	1946-2021
Election	76	.25	.4358899	0	1	own calculation	1946-2021
Coalition	76	.3157895	.4679181	0	1	own calculation	1946-2021
Population Growth Rate	60	1.869443	.4224517	1.084194	2.42579	World Bank(WDI)	1960-2020
GDP per capita growth	60	2.718012	3.811714	-7.147846	9.509983	World Bank(WDI)	1961-2020
Trade of GDP	61	.4762753	.3061885	0	1	World Bank(WDI)	1960-2020
Age Dependency Ratio	61	67.99049	13.50426	49.08267	86.21763	World Bank(WDI)	1960-2020
Inflation	60	32.47962	31.23193	2.352437	143.6397	World Bank(WDI)	1960-2019

On the other hand, the academic freedom index and democracy index are added to capture any possible partisanship motivation for Turkish politics. The expected way of effect is as follows: a shift toward a left-wing party boosts academic freedom and democracy Berggren and Bjørnskov (2021).

3.3 Structural change

The structural change process of a country is defined as the reallocation of labor from agriculture to industry and services. In this study, the possible proxies of structural change have been designated as total factor productivity, between component of labor productivity and sectoral employment.

Aggregate TFP is calculated following the primal approach similar to Atiyas and Bakış (2014) . The primal approach employs data on factor shares, inputs, and outputs to estimate productivity growth. The production function is:

$$Y_t = A_t F(K_t, L_t)$$

where A_t is total factor productivity, K_t is capital and L_t is labor in time t.

Capital and labor share are represented as α and $1 - \alpha$, respectively; thanks to the constant returns to scale assumption, sum of the capital and labor share is equal to one. Therefore, the TFP growth is estimated by the following equation:

$$TFPG = \ln (A_{t+1}/A_t) = \ln (Y_{t+1}/Y_t) - \alpha \ln (K_{t+1}/K_t) - (1 - \alpha) \ln (L_{t+1}/L_t)$$

While output and employment data are obtainable from Bakış and Acar (2020), the above equation demands the calculation of capital series. Capital series are constructed by the perpetual inventory method, which uses investment series.

$$K_{t+1} = (1 - \delta)K_t + I_t$$

The initial level of capital K_0 is necessary to calculate the aggregate capital series. $\bar{g}$ is theoretically the growth rate of capital and output in the steady-state. In

practice, Atiyas and Bakış (2014) use the average GDP growth rate over some given years (10) following t=0. Following the same logic GDP growth rate is calculated as the average of the years between 1949 and 1958, numerically 6.14. As in the literature, δ is 0.06. After obtaining the initial value of capital, the law of motion of the capital equation gives the aggregate capital series.

$$K_0 = \frac{I_0}{\bar{g}} + \delta$$

Most studies that suppose the constant return to scale and Cobb-Douglas production function accept capital share as 0.33 Mankiw, Romer, and Weil (1992). However, Bakış and Acar (2020) considered the adjustment for those who do not work for wages and calculated the share of capital payments in national income as 0.51. Both capital share ratios are employed; figure three illustrates the total factor productivity growth rate with α equals 0.51 and 0.33.

In the next step, sectoral total factor productivity is constructed by employing sectoral employment, GDP, and investment data from Bakış and Acar (2020). The same logic with the calculation of aggregate TFP has followed. Since different sectors have different capital share ratio, Valentinyi and Herrendorf (2008) is benefited for capital shares as $\alpha_{agriculture} = 0.55$, $\alpha_{industry} = 0.33$ and $\alpha_{services} = 0.33$.

Even though aggregate TFP is calculated with depreciation rate of $\delta = 0.06$; sectoral depreciation rates differentiates as $\delta_{agriculture} = 0.04$, $\delta_{industry} = 0.06$ and $\delta_{services} = 0.06$. Bakış and Acar (2020) distribute the total capital stock to the sectors based on the assumption that the return on capital in different sectors should not be different in the long run. The production function is defined as:

$$Y_j = A_j K_j^{\alpha_j} L_j^{1-\alpha_j}$$

In the above equation, j represents agriculture, industry, or services, Y is sectoral GDP, K is sectoral capital, and L is sectoral employment.

With the assumption that the return on capital in different sectors should be identical in the long run, we can rewrite the equation as:

$$\frac{\alpha_a P_a Y_a}{K_a} = \frac{\alpha_i P_i Y_i}{K_i} = \frac{\alpha_s P_s Y_s}{K_s}$$

In this equation, α represents the share of capital in national income, Y represents the sector's revenue, P represents the sector's GDP deflator, and K represents the sector's capital stock. Hence it gives the sector's output at current prices. When the denominator is multiplied by national income at current prices, it will give the below equation where v_j gives the share of the sector j in total output.

$$\frac{\alpha_a v_a}{K_a} = \frac{\alpha_i v_i}{K_i} = \frac{\alpha_s v_s}{K_s}$$

Since many things affect sectoral shares in GDP, it is calculated as five years average of the years between 1960 and 1968. To find sectoral capital, the last equation is based on the fact that the total capital is equal to the summation of the sectors' capital. The solution of the equation gives the sectoral capital:

$$K = K_a + K_i + K_s$$

$$K_a = K_s \frac{\alpha_a v_a}{\alpha_s v_s}$$

$$K_i = K_s \frac{\alpha_i v_i}{\alpha_s v_s}$$

Lastly, within and between component of output per worker i.e., labor productivity, has been calculated by following Martins (2019) and Atiyas and Bakış (2020).

$$\triangle w = \sum_{t=0}^{n} \triangle w_i \frac{s_{i,t=0} + s_{i,t=1}}{2} + \triangle s_i \frac{w_{i,t=0} + w_{i,t=1}}{2}$$

The difference in output per worker is equal to the change in output per worker in sector i times average employment share plus the change in employment

share times average productivity level. The first component corresponds to the within component, which refers to productivity growth in the individual firm through technology investments, higher-skilled labor, research, development, etc. The second is between component that characterizes increased productivity by reallocating labor from the low productivity sector to the high productivity sector.

Table two shows the descriptive statistics and data sources of structural change related variables. As explained above, some of these data are own calculation by following literature, others are outsourced.

Table 2. Descriptive Statistics and Data Sources of Structural Change

Variables	Obs	Mean	Std. Dev.	Min	Max	Sources	Time Span
TFP at constant prices	60	1.072309	.0873712	.9114195	1.232071	FRED	1960-2019
TFP with $\alpha = 0.51$	68	122.2331	14.91696	98.22232	163.2823	own calculation	1951-2018
TFP with $\alpha = 0.33$	68	815.3477	208.7354	532.0019	1215.92	own calculation	1951-2018
TFP agriculture	59	52.88158	8.394637	38.13918	73.13595	own calculation	1960-2018
TFP industry	59	672.9473	173.3287	437.4714	1075.385	own calculation	1960-2018
TFP services	59	2072.241	311.7905	1568.9	2600.553	own calculation	1960-2018
Capital stock	70	2215343	2597497	178764.9	1.02e+07	Penn World Tables	1950-2019
Gross fixed capital formation	53	21.62494	5.531603	11.87302	29.85714	World Bank(WDI)	1968-2020
Machinery and transport equipment	56	12.91299	4.55816	5.519779	20.08896	World Bank(WDI)	1963-2018
Total output per worker	69	28150.88	15278.1	8348.046	60611.08	own calculation	1950-2018
Employment in agriculture	69	6204.398	520.64911	4867	7148.198	own calculation	1950-2018
Employment in industry	69	3551.331	1919.675	736.0815	7667	own calculation	1950-2018
Employment in services	69	5634.948	4119.102	597.0695	15777	own calculation	1950-2018
Between component of agriculture	68	-81.85392	136.7787	-536.4209	238.6122	own calculation	1951-2018
Between component of industry	68	62.6141	244.4314	-772.1806	910.2338	own calculation	1951-2018
Between component of services	68	413.0343	490.3324	-913.2719	2164.988	own calculation	1951-2018

CHAPTER 4

METHODOLOGY

The most common forms in the literature to investigate the existence of political cycles is to run the auto-regressive process of dependent variable on itself, Drazen (2000).

$$Y_t = \sum_{i=1}^{s} a_i Y_{t-i} + b_0 + \sum_{j} b_j X_{jt} + dPDUM_t + \varepsilon_t$$

Y_t represents the outcome variable such as GDP, unemployment, categories of government spending, or academic freedom index. Independent variables consist of lag variables of the outcome variable, other control variables that may affect the dependent variable, and political dummy variables, which may be either electoral or partisan.

On the structural change side, two different methodologies will be used. The first one will be the OLS, and the structural model will establish by following the literature Aray (2016) , Isaksson (2007) and Martins (2019). Since establishing a structural model consists of some hardships in capturing the impact of the political dummy variable on the country's development process, a non-structural one, the VAR model, is utilized as a second methodology.

VAR model is a system of simultaneous equations in that all the variables are endogenous and exogenous. It is not necessary to specify variables. All of them are described with their lags and lags of other endogenous variables, and the analysis does not require any theoretical background. All variables must be stationary. A VAR(1) model can be written as matrix notation:

$$\begin{bmatrix} Y_{1,t} \\ Y_{2,t} \end{bmatrix} = \begin{bmatrix} c_1 \\ c_2 \end{bmatrix} + \begin{bmatrix} a_{1,1} & a_{1,2} \\ a_{2,1} & a_{2,2} \end{bmatrix} * \begin{bmatrix} Y_{1,t-1} \\ Y_{2,t-1} \end{bmatrix} + \begin{bmatrix} e_{1,t} \\ e_{2,t} \end{bmatrix}$$

VAR has three essential tools; block significance and causality tests, impulse responses, and variance decomposition. With causality tests, whether lags of one of

the variables describe the current value of the other variable or not is checked. The test attempts to answer ‘’Do changes in Y1 cause changes in Y2?”. Secondly, impulse response analysis is performed to test the responsiveness of the dependent variables to shocks in the error term. Lastly, variance decomposition gives the proportion of the dependent variables’ movements due to their shocks versus shocks to other variables.

CHAPTER 5

RESULTS

Initially, estimation results of the political business cycles will be displayed with different political color variables. The first dependent variable is the academic freedom index taken from the Quality of Government data set and asks, ”To what extent is academic freedom respected?”. It is understood as the right of academics to freedom of teaching and discussion, liberty in carrying out research and disseminating and publishing the results thereof, freedom to express freely their opinion about the institution or system in which they work, freedom from institutional censorship and freedom to participate in professional or representative academic bodies Coppedge et al. (2020). It is based on subjective assessments of carefully selected country experts and consists of five expert-coded indicators the freedom to research and teaching, the freedom of academic exchange and dissemination, the institutional autonomy of universities, campus integrity, and the freedom of academic and cultural expression. It is scaled between zero and one.

As mentioned in the methodology part, the dependent variable will be explained by its' lags and other control variables. To estimate this model, the stationarity of the dependent variable is necessary. It is checked by applying the Dickey-Fuller test, in which the null hypothesis says the variable has a unit root. Additionally, the number of lags is defined by Akaike-Schwarz and Hannan–Quinn information criterion.

After providing stationarity and optimal lag conditions, the literature was pursued for other control variables. Berggren and Bjørnskov (2021) attempts to find potential determinants of variation in the academic freedom index by employing an error correction model. Their results indicate that electoral democracy, bicameral legislature, a more proportional electoral system, and higher GDP per capita positively affected academic freedom.

They separated control variables into formal institutional characteristics, economic indicators, and national legislative. Formal institutional characteristics include judicial accountability and dummies for electoral democracy and autocracy. The logarithm of GDP per capita, population size, and total trade volume relative to GDP were selected as economic indicators. The degree of concentration among the parties in the legislature, the ideological position of the incumbent cabinet, and the average ideological position of all parties in the legislature capture the national legislative part.

In this research, the democracy index, which is a unified scale ranging from +10 (strongly democratic) to -10(strongly autocratic), is added to capture institutional characteristics; population growth rate, GDP per capita growth rate, and trade of GDP capture economic conditions of the country; the judicial corruption index aims to catch the national legislative part. The judicial corruption index asks, ”How often do individuals or businesses make undocumented extra payments or bribes to speed up or delay the process or to obtain a favorable judicial decision?”.

Table three illustrates the OLS results of the model, where the academic freedom index is the dependent variable. Several political color dummies are utilized, but in the results part, only the significant ones take place to have a neat description of the analysis. The coefficient of the Potrafke ideology index can be interpreted as an increase of the Potrafke ideology index, for example, from three (left-wing and right-wing parties coalition government) to four (leftwing government), increase the growth of the academic freedom index by 0.016 unit. Similarly, the coefficients of the Çarkoğlu Ideology Index, LeftDPI, and LeftRodrigues indicate that change toward the left-wing party boosts the academic freedom index. Also, the coefficient of the LeftKC displays that if there is a left party in the coalition, the academic freedom index increases by 0.031 units. The election dummy’s coefficient demonstrates that academic freedom increases in the previous year of the election.

The impact and the sign of coefficients of the other control variables also mostly match our expectations. To illustrate, when the country becomes more

Table 3. OLS Results of Academic Freedom Index

VARIABLES	(1) Δ Academic freedom	(2) Δ Academic freedom	(3) Δ Academic freedom	(4) Δ Academic freedom	(5) Δ Academic freedom
Academic freedom L1	-0.128	-0.300*	-0.198	-0.015	-0.089
	[0.143]	[0.154]	[0.155]	[0.151]	[0.139]
Portafke ideology index	0.016**				
	[0.008]				
Democracy index	0.008***	0.011***	0.009***	0.008***	0.009***
	[0.003]	[0.002]	[0.003]	[0.003]	[0.003]
Judicial corruption decision	0.111*	-0.074	0.116*	0.092	0.081
	[0.058]	[0.077]	[0.058]	[0.056]	[0.057]
Population growth	0.054	0.235***	0.028	0.041	0.063
	[0.045]	[0.073]	[0.047]	[0.043]	[0.046]
GDP per capita growth	-0.000	0.001	-0.000	-0.000	-0.000
	[0.001]	[0.001]	[0.002]	[0.001]	[0.001]
Trade of GDP	0.158**	0.337***	0.186**	0.121**	0.149**
	[0.070]	[0.104]	[0.075]	[0.059]	[0.069]
Çarkoglu ideology index		0.006*			
		[0.003]			
Left DPI			0.089***		
			[0.032]		
Right DPI			0.015		
			[0.013]		
Election				0.022*	
				[0.013]	
Left KÇ					0.031**
					[0.015]
Constant	-0.529***	-0.507**	-0.498***	-0.410**	-0.446**
	[0.182]	[0.196]	[0.181]	[0.156]	[0.176]
Observations	58	34	44	58	58
R-squared	0.402	0.664	0.528	0.381	0.405
Ideology Index	Portafke	Çarkoğlu	LeftDPI RightDPI	Election	LeftKÇ
Year	All	Between 1961 and 1995	All	All	All

Robust standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1

democratic and has a higher trade volume, the growth of the academic freedom index increases. On the other hand, the coefficient of judicial corruption decision points out that growing judicial corruption positively affects academic freedom. However, this result seems to be conducted on the nature of the data. When the data is plotted in figure two, a declining trend of the variable from the 2000s to 2019 could be seen.

In the next step, the results of the categories of government expenditure will be presented. Models are established by following the literature, Alesina et al. (1991) , Drazen (2000), Potrafke (2009) and Sakurai and Menezes-Filho (2011), and consists of optimal lags of dependent variable, ideology index and other control variables. Potrafke (2009) questions whether globalization restricts the partisan politics on the social expenditures of government. He chooses control variables such as the growth rate of GDP per capita, the growth rate of the unemployment rate, and the growth rate of dependency ratio. Therefore, the general economic situation, labor market situation, and demographic development are considered.

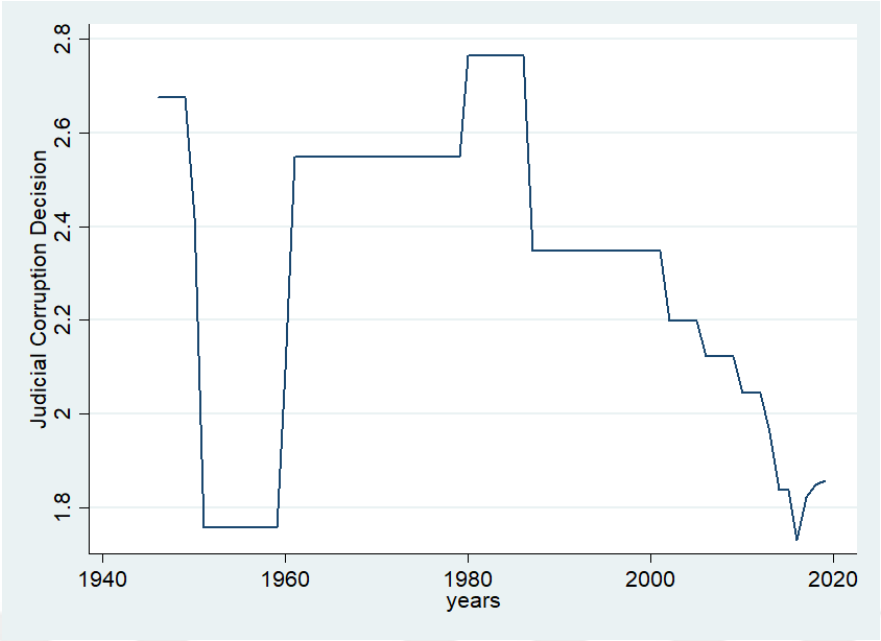


Figure 2. Judicial corruption index

Sakurai and Menezes-Filho (2011) investigates the existence of the electoral and partisan cycles at the municipal level in Brazil. They followed a similar methodology with literature, and their control variables are municipal revenues from constitutional transfers (from the federal government and respective state governments); rate of urbanization; total population (in natural logarithms); the proportion of young people (people under 14 years old), and proportion of elderly (people over 65 years old) in each municipality. Models also include macroeconomic indicators, third-order polynomials, time trends, and inflation, plus the level and growth of national and state-level GDP per capita.

Consequently, the growth rate of the population, the growth rate of GDP per capita, age dependency ratio, inflation GDP deflator, and coalition are picked as control variables of the models where categories of government expenditure are dependent variables.

The first dependent variable is military expenditure, and it refers to the amount of financial resources allocated by a state for its armed forces. The data is formed as a percent of GDP, and table four presents the OLS results. Even though the

coefficient of the Çarkoğlu ideology index is insignificant, the coefficient of the Portafke ideology index suggests that change in government from right to left lowers military expenditure by 0.186 units. In the fourth and fifth models, PolACR is also added to control the number of parties in the government. It suggests that if the number of parties increases in the government, it causes an increase in military expenditure.

Table 4. OLS Results of Military Expenditure

	(1)	(2)	(3)	(4)	(5)
VARIABLES	Δ Military Expenditure	Δ Military Expenditure	Δ Military Expenditure	Δ Military Expenditure	Δ Military Expenditure
Military expenditure L1	-0.155	-0.398	-0.090	-0.147	-0.332
	[0.159]	[0.287]	[0.146]	[0.156]	[0.282]
Portafke ideology index	-0.186*			-0.196*	
	[0.108]			[0.112]	
GDP per capita growth	-0.018	0.001	-0.010	-0.015	0.005
	[0.014]	[0.027]	[0.018]	[0.015]	[0.027]
Population growth	0.141	-0.615	0.206	0.110	-0.343
	[0.257]	[0.904]	[0.253]	[0.259]	[0.879]
Age dependency ratio	-0.175	-0.891	-0.456	-0.167	-1.633
	[0.273]	[1.527]	[0.694]	[0.277]	[1.514]
Inflation	-0.410	-1.875***	-0.943	-0.390	-2.036***
	[0.316]	[0.498]	[0.725]	[0.304]	[0.509]
Coalition	0.296	0.306	0.048	0.160	0.076
	[0.243]	[0.243]	[0.247]	[0.209]	[0.268]
Çarkoglu ideology index		-0.088			-0.068
		[0.060]			[0.059]
Left DPI			0.038		
			[0.456]		
Islamic DPI			-0.494		
			[0.474]		
Pol ACR				0.090	0.146*
				[0.066]	[0.077]
Constant	0.241	2.757***	0.246	0.285	2.664**
	[0.394]	[0.975]	[0.692]	[0.403]	[0.958]
Observations	58	33	45	58	33
R-squared	0.153	0.421	0.141	0.165	0.449
Ideology Index	Portafke	Carkoglu	LeftDPI IslamicDPI	Portafke PolACR	Çarkoğlu PolACR
Year	All	Before 1995	All	All	Before 1995

Robust standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1

Transfer expenditure of the government refers to payment to society through social programs such as welfare, student grants, and social security. The data is formed as a percent of GDP as well. Similar steps have been pursued to establish the model, such as assuring the stationarity of the dependent variable, determining the optimal number of lags, etc. Even though all of the ideology indexes are insignificant in table five, if the government is formed as a coalition with several parties, it creates an increase in the growth of the transfer expenditure. It is consistent with the well-known fact of Turkish political history that coalitions and weak governments

were generally short-sighted and satisfied the short-term demands of various groups by resorting to budget deficits Altuğ et al. (2008). Hence, transfer expenditure seems to be one channel coalition governments exploit for their supporters. Besides, the coefficient and sign of GDP per capita growth imply negative correlation between GDP per capita level and transfer payments. It points out that a higher level of GDP per capita that can be seen as a higher level of development, making manipulation of budget tools via transfer expenditures harder.

Table 5. OLS Results of Transfer Expenditure

	(1)	(2)	(3)	(4)	(5)
VARIABLES	Δ Transfer Expenditure	Δ Transfer Expenditure	Δ Transfer Expenditure	Δ Transfer Expenditure	Δ Transfer Expenditure
Transfer Expenditure L1	0.145	-0.390	0.083	0.143	0.143
	[0.135]	[0.279]	[0.112]	[0.137]	[0.134]
Transfer Expenditure L2	-0.351	0.264	-0.397	-0.347	-0.350
	[0.322]	[0.282]	[0.319]	[0.323]	[0.322]
Portafke ideology index	-0.003				
	[0.008]				
GDP percapita growth	-0.007*	0.000	-0.008*	-0.007*	-0.007*
	[0.004]	[0.002]	[0.004]	[0.004]	[0.004]
Population growth	0.104	0.069	0.170	0.105	0.108
	[0.107]	[0.096]	[0.129]	[0.107]	[0.106]
Inflation	0.067	0.008	0.036	0.070	0.065
	[0.066]	[0.059]	[0.111]	[0.064]	[0.065]
Age dependency ratio	-0.126	-0.119	-0.222	-0.126	-0.125
	[0.098]	[0.155]	[0.136]	[0.099]	[0.098]
Coalition	0.059**	0.015	0.055	0.054**	0.037*
	[0.026]	[0.012]	[0.034]	[0.024]	[0.021]
Çarkoglu ideology index		0.001			
		[0.003]			
Left DPI			0.090		
			[0.062]		
Right DPI			0.051		
			[0.043]		
Pre-election				0.004	
				[0.017]	
Left KÇ					0.024
					[0.023]
Constant	-0.139	-0.061	-0.240	-0.148	-0.151
	[0.168]	[0.132]	[0.191]	[0.164]	[0.162]
Observations	59	34	45	59	59
R-squared	0.319	0.250	0.425	0.318	0.323
Ideology Index	Portafke	Carkoglu	LeftDPI RightDPI	Preelection	LeftKÇ
Lag	Yes	Yes	Yes	Yes	Yes
Year	All	Before 1995	All	All	All

Robust standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1

Above expenditure types are classified by their economic meaning; it is divided into public consumption, investment, and transfer expenditures. However, budget by institutions refers to the spending of each ministry, such as the Ministry of the Military, Ministry of Education, Ministry of Justice, etc. This classification may also help to capture cycles. As in the literature, Cusack et al. (1989), it is expected to have a larger government size for left-wing parties in terms of expenditure of

ministries, except Ministry of Military and Religious Affairs, because right-wing parties are willing to spend more on these ministries Schulze and Rose (1998). The data of this part is formed as a percent of the total budget.

Table six shows the result of the model where the growth of Religious Affairs' spending is the dependent variable. While the coefficients of the Portafke ideology index, Left DPI and Islamic DPI are insignificant, the coefficient of Pol ACR implies that an increasing number of parties in the government causes a fall in the expenditure on the religious affair.

Table 6. OLS Results of Religious Affairs

	(1)	(2)	(3)	(4)	(5)
VARIABLES	Δ Religious affairs	Δ Religious affairs	Δ Religious affairs	Δ Religious affairs	Δ Religious affairs
Religious affairs L1	0.067	0.143	0.242	0.059	-0.004
	[0.137]	[0.163]	[0.154]	[0.134]	[0.132]
Religious affairs L2	0.183	0.189	0.172	0.152	0.154
	[0.121]	[0.140]	[0.121]	[0.125]	[0.128]
Left DPI		-0.009			
		[0.045]			
Islamic DPI		0.023			
		[0.063]			
GDP per capita growth	0.005	0.004	0.005	0.004	0.004
	[0.004]	[0.004]	[0.004]	[0.004]	[0.004]
Population growth	-0.122*	-0.124*	-0.098	-0.108	-0.125*
	[0.070]	[0.063]	[0.079]	[0.069]	[0.073]
Age dependency ratio	0.148*	0.183*	0.135	0.143*	0.177*
	[0.087]	[0.097]	[0.115]	[0.084]	[0.093]
Inflation	-0.107	-0.090	-0.115	-0.108	-0.089
	[0.069]	[0.122]	[0.096]	[0.067]	[0.071]
Portafke ideology index	0.006				0.024
	[0.014]				[0.016]
Pre-election			-0.083*		
			[0.042]		
Pre-election*Left			0.071		
			[0.067]		
Government BS				-0.053	
				[0.046]	
Pol ACR					-0.033*
					[0.019]
Constant	0.157	0.152	0.156	0.152	0.132
	[0.106]	[0.122]	[0.104]	[0.094]	[0.107]
Observations	59	45	45	59	59
R-squared	0.157	0.201	0.295	0.169	0.201
Ideology Index	Portafke	LeftDPI IslamicDPI	Pre-election	GovernmentBS	Portafke PolACR
Lag	Yes	Yes	Yes	Yes	Yes
Year	All	All	All	All	All

Robust standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1

Interestingly, the coefficient of the pre-election dummy indicates that in the previous year of the election, Religious Affairs decrease their spending. It might be because Religious Affairs are mainly used with partisan motivation instead of

re-election purposes. For example, if a change toward a right-wing party occurs, the party will spend on religious items such as building a mosque during their term, not just before the election, to satisfy their voters.

Table seven illustrates the regression result of the Ministry of Culture. While the coefficient of the Portafke, Çarkoğlu, LeftDPI, and RightDPI are insignificant, LeftKÇ and LeftRPT are significant. The coefficient of LeftKÇ and LeftRPT imply that if the coalition includes a left-wing party and a change toward a left-wing party after two years of election increases the spending of the Ministry of Culture, respectively. Besides, in the fourth model, the coefficient of coalition indicates that if the government is a coalition, then the expenditure of the Ministry of Culture decreases by 0.138 units.

Table 7. OLS Results of Ministry of Culture

	(1)	(2)	(3)	(4)	(5)
VARIABLES	Δ Ministry of culture	Δ Ministry of culture	Δ Ministry of culture	Δ Ministry of culture	Δ Ministry of culture
Ministry of culture L1	0.211	-0.067	0.978***	0.150	0.270
	[0.225]	[0.162]	[0.191]	[0.237]	[0.201]
Ministry of culture L2	0.138	-0.073	-0.361	0.176	0.192
	[0.172]	[0.134]	[0.241]	[0.142]	[0.151]
Portafke ideology index	0.009				
	[0.053]				
GDP per capita growth	0.001	0.010	0.002	0.003	0.001
	[0.004]	[0.009]	[0.002]	[0.005]	[0.004]
Population growth	-0.104	0.462	-0.012	-0.080	-0.125
	[0.140]	[0.768]	[0.066]	[0.133]	[0.132]
Age dependency ratio	0.013	-1.661	-0.032	0.010	0.029
	[0.124]	[1.213]	[0.081]	[0.121]	[0.126]
Coalition	-0.006	0.004	-0.023	-0.138***	-0.025
	[0.054]	[0.067]	[0.031]	[0.047]	[0.057]
Çarkoglu ideology index		0.062			
		[0.078]			
Left DPI			-0.024		
			[0.035]		
Right DPI			0.068		
			[0.047]		
Left KÇ				0.185*	
				[0.102]	
Left RPT					0.076*
					[0.042]
Constant	0.455*	0.621	0.195**	0.435**	0.490**
	[0.263]	[0.776]	[0.090]	[0.194]	[0.201]
Observations	59	34	45	59	59
R-squared	0.147	0.390	0.737	0.200	0.191
Ideology Index	Portafke	Carkoglu	LeftDPI RightDPI	LeftKÇ	LeftRPT
Lag	Yes	Yes	Yes	Yes	Yes
Year	All	All	All	All	All

Robust standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1

Lastly, the Health Ministry's results can be noticed in table eight. In the first model, the coefficient of the Portafke ideology variable points out that a shift toward a left-wing party extends the spending of the Ministry of Health. Another significant coefficient belongs to population growth, which states that when the growth rate of the population rises, health expenditure declines by 0.88 units.

In the second and third models, the coefficient of Çarkoğlu Ideology Index and PolContinous from DPI suggest a similar result with Portafke, a change from right-wing to left-wing party enlarges the spending of the Ministry of Health.

Table 8. OLS Results of Ministry of Health

	(1)	(2)	(3)	(4)	(5)
VARIABLES	Δ Ministry of health	Δ Ministry of health	Δ Ministry of health	Δ Ministry of health	Δ Ministry of health
Ministry of health L1	-0.324***	-0.598***	-0.324**	-0.338***	-0.363***
	[0.120]	[0.127]	[0.148]	[0.126]	[0.113]
Ministry of health L2	0.132	0.158	0.080	0.127	0.180
	[0.111]	[0.180]	[0.123]	[0.120]	[0.108]
Portafke ideology index	0.144**				0.225***
	[0.072]				[0.081]
GDP percapita growth	0.018	0.005	0.018	0.013	0.013
	[0.015]	[0.018]	[0.017]	[0.015]	[0.015]
Population growth	-0.885*	-2.579**	-1.076**	-0.741	-0.898*
	[0.472]	[1.040]	[0.494]	[0.484]	[0.475]
Age dependency ratio	0.612	2.963**	0.327	0.558	0.734
	[0.524]	[1.374]	[0.628]	[0.528]	[0.523]
Inflation	-0.394	0.280	-0.225	-0.365	-0.279
	[0.256]	[0.460]	[0.299]	[0.276]	[0.258]
Çarkoglu ideology index		0.224***			
		[0.074]			
PolContinous			0.333*		
			[0.191]		
GovernmentBS				-0.566**	
				[0.252]	
PolACR					-0.142*
					[0.073]
Constant	1.782**	4.185**	2.607**	1.972**	1.636*
	[0.869]	[1.637]	[0.977]	[0.860]	[0.869]
Observations	59	34	45	59	59
R-squared	0.264	0.528	0.246	0.271	0.304
Ideology Index	Portafke	Carkoglu	PolContinous	GovernmentBS	Portafke PolACR
Lag	Yes	Yes	Yes	Yes	Yes
Year	All	All	All	All	All

Robust standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1

Additionally, in the second model, the coefficient of age dependency ratio displays that increasing age dependency ratio induces a rise in spending on the Ministry of Health. Furthermore, in the fourth model, the coefficient of governmentBS indicates that if a military coup establishes the government, it diminishes the spending of Ministry of Health. In the last model, the coefficient of

PolACR suggests that if the number of parties increases in the government, it induces a fall in the expense of the ministry of health.

Until now, results have indicated the existence of political business cycles in Turkey from the 1960s to the 2020s. In the second part, structural change-related variables will be the dependent variable to analyze the political color variable effect on them. These variables are total factor productivity, sectoral employment, and between component of labor productivity.

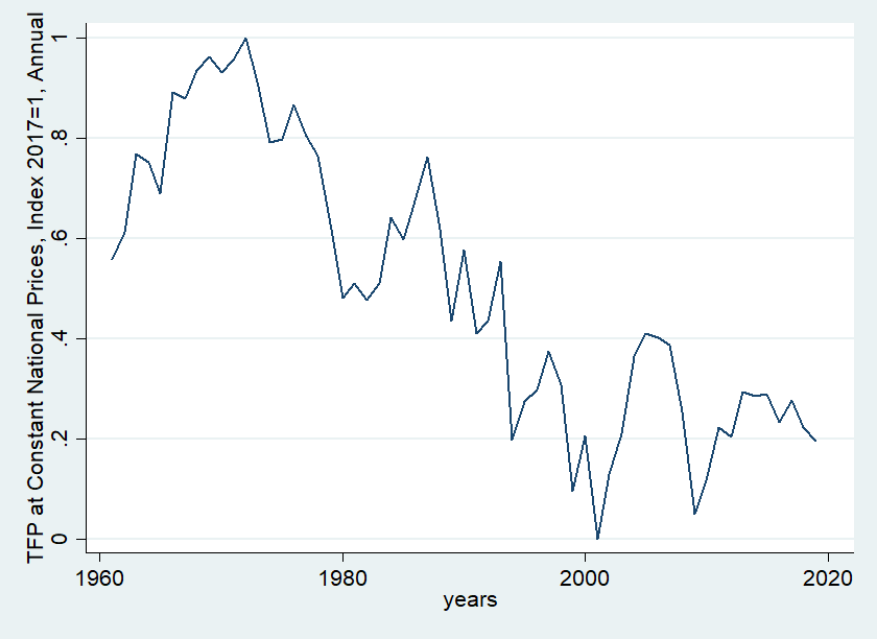


Figure 3. Total factor productivity (PWT)

Firstly, several types of total factor productivity are used from various sources and own calculations, such as TFP with constant prices, aggregate TFP with different capital share ratios, sectoral TFP, etc. Figure three illustrates the total factor productivity at constant national prices, figure four displays the total factor productivity with two different capital share values such as $\alpha = 0.33$ and $\alpha = 0.51$, and figure five shows the change of sectoral TFP from the 1960s to the 2020s. All figures show the ups and downs of the Turkish economy depending on important events.

In the 1960s, import substitution and central planning were the main tools for economic developments Bayar (1996). Due to the era of import-substituting industrialization between 1950-1970, total factor productivity increased in the non-agricultural sector in the post-1980s, which caused total factor productivity growth in aggregate. While the 1980s were flourishing years in TFP increases, these growths stopped considerably in the 1990s Bakış and Acar (2020). The possible explanations for the decreasing trend in the 1990s are trade liberalization, institutions, macro-economic policies, etc. Altuğ et al. (2008).

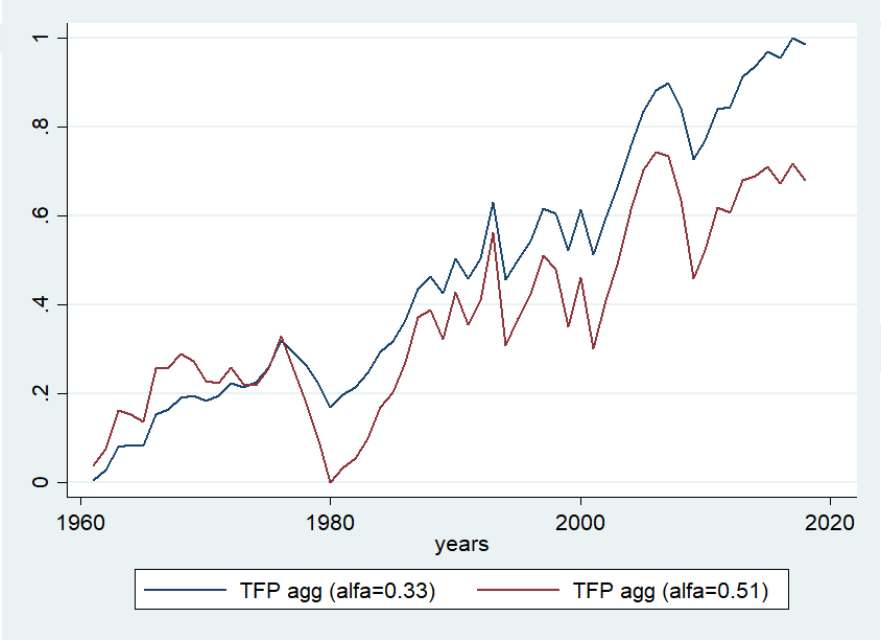


Figure 4. Total factor productivity with $\alpha = 0.33$ and $\alpha = 0.51$

Lastly, 2003-2007 is the sub-period with the highest TFP increase. During the global financial crisis between 2008 and 2010, TFP growth experienced one of the sharpest declines. The reason for the low productivity after 2007 is the existence of disruptions in the functioning of political and economic institutions Acemoglu and Ucer (2015).

The correct model is tried to find by following Rodrik (2013), Aray (2016), Isaksson (2007). In the model, the school enrolment ratio in primary school is taken

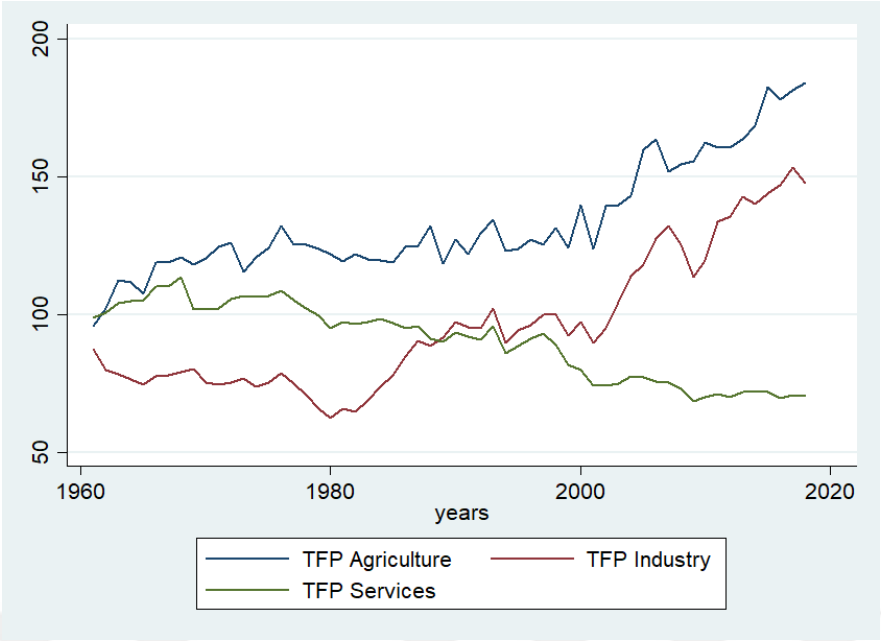


Figure 5. TFP agriculture, TFP industry and TFP services

as a proxy for human capital Barro (1991). Gross fixed capital formation and machine and transport equipment as a percent of value-added in manufacturing are proxies for the physical capital. Trade volume is added to capture globalization's effects, which boosts technology transfer and efficiency. Nevertheless, in Latin America and Sub-Saharan Africa, due to moving in the wrong direction of labor, the structural change process has not been fostered McMillan and Rodrik (2011).

FDI is assumed as a channel that brings knowledge into a country. It is also considered a negative correlation between human capital and total factor productivity for relatively poor countries, which shows the importance of quality of education together with the level of education Isaksson (2007).

Table nine displays the OLS results. Dependent variables are total factor productivity at constant prices from PWT, total factor productivity with $\alpha = 0.33$ and $\alpha = 0.51$, and sectoral total factor productivity. It is noticed from the table that a shift in the governance from left to the right increases TFP in constant prices, TFP with capital share $\alpha = 0.33$, TFPagriculture, and TFPindustry. Furthermore, if the government is a short-term coalition government, it negatively influences the total

Table 9. OLS Results of Total Factor Productivity

VARIABLES	(1) TFP PWT	(2) TFP with α = 0.33	(3) TFP with α = 0.51	(4) TFP Agriculture	(5) TFP Industry	(6) TFP Services
Portafke ideology index	0.020*	0.022***	0.024	0.029**	0.029**	-0.006
	[0.010]	[0.008]	[0.018]	[0.013]	[0.014]	[0.021]
School enrollment primary	0.005**	0.006**	0.011***	0.002	0.007**	-0.000
	[0.002]	[0.002]	[0.004]	[0.004]	[0.003]	[0.006]
Gross fixed capital formation	0.010***	0.009***	0.020***	-0.001	0.012***	0.024***
	[0.002]	[0.002]	[0.003]	[0.004]	[0.003]	[0.007]
Machinery and transport equipment	0.010***	0.023***	0.026***	0.028***	0.018***	-0.001
	[0.003]	[0.004]	[0.006]	[0.006]	[0.005]	[0.008]
Foreign direct investment	0.014*	0.003	0.013	0.014	0.016	0.006
	[0.007]	[0.008]	[0.011]	[0.022]	[0.011]	[0.019]
Domestic credit to private sector	-0.003***	0.004***	0.000	0.008***	0.008***	-0.010***
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.002]
Trade of GDP	-0.002*	0.002**	0.001	-0.002	0.001	-0.004
	[0.001]	[0.001]	[0.001]	[0.002]	[0.001]	[0.004]
Population growth	0.277***	-0.180***	0.019	-0.097	-0.163*	0.650***
	[0.050]	[0.061]	[0.064]	[0.096]	[0.083]	[0.157]
Liberal democracy index	-0.115	-0.067	-0.030	-0.127	-0.119	-0.090
	[0.083]	[0.105]	[0.152]	[0.154]	[0.146]	[0.248]
Coalition	-0.029**	-0.047***	-0.020	-0.074***	-0.054***	0.065
	[0.014]	[0.016]	[0.025]	[0.027]	[0.019]	[0.040]
Constant	-0.154	-0.441	-1.690***	-0.008	-0.808**	-0.847
	[0.251]	[0.266]	[0.366]	[0.432]	[0.385]	[0.580]
Observations	45	45	45	45	45	45
R-squared	0.892	0.989	0.958	0.944	0.983	0.942
Ideology Index	Portafke	Portafke	Portafke	Portafke	Portafke	Portafke

Robust standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1

factor productivity. It is unsurprising because majority governments can make decisions more quickly and effectively than coalitions Isaksson (2007).

The coefficients of other variables were mainly consistent with the literature. To illustrate, school enrollment ratio, gross fixed capital formation, machine and transport equipment as a percent of value-added in manufacturing and foreign direct investment positively influence total factor productivity. Since the coefficients of the domestic credit to the private sector, trade of GDP, and population growth are significant in some models and insignificant in others, it is hard to interpret the correlation between these variables and total factor productivity. To conclude, a shift of government from right-wing to left-wing party leads to productivity gain.

By definition, total factor productivity captures all the factors that affect growth other than capital and labor, which also gives its residual nature. Therefore, sectoral employment is also analyzed to work with a more prominent component, and table ten displays the results.

Table 10. OLS Results of Sectoral Employment

VARIABLES	(1) Agriculture N	(2) Agriculture N	(3) Agriculture N	(4) Industry N	(5) Industry N	(6) Industry N	(7) Services N	(8) Services N	(9) Services N
Portafke ideology index	-0.061**			0.013			0.022**		
	[0.027]			[0.012]			[0.009]		
School enrollment primary	-0.009	-0.016	-0.014						
	[0.011]	[0.013]	[0.010]						
Machinery and transport	-0.062***	-0.059***	-0.045**	0.005*	0.004	0.002	0.012***	0.008***	0.006
	[0.016]	[0.018]	[0.018]	[0.003]	[0.002]	[0.004]	[0.003]	[0.003]	[0.004]
Foreign direct investment	-0.099***	-0.075**	-0.054	-0.001	0.008	0.010	0.001	0.000	-0.007
	[0.032]	[0.034]	[0.033]	[0.008]	[0.007]	[0.008]	[0.009]	[0.009]	[0.009]
Domestic credit to private sector	0.004	0.005	0.002	0.005***	0.005***	0.005***	0.005***	0.005***	0.006***
	[0.003]	[0.003]	[0.003]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
Trade of GDP	0.002	-0.001	0.003	0.001	0.001	0.000	-0.000	0.000	-0.001
	[0.005]	[0.005]	[0.005]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
Population growth	-0.150	0.076	0.157	-0.084*	-0.055	-0.048	-0.092*	-0.119**	-0.164***
	[0.262]	[0.269]	[0.230]	[0.050]	[0.052]	[0.065]	[0.051]	[0.049]	[0.053]
Liberal democracy index	0.436	0.685	0.468	-0.140	-0.145**	-0.104	-0.197**	-0.211***	-0.175**
	[0.481]	[0.494]	[0.383]	[0.086]	[0.054]	[0.062]	[0.085]	[0.067]	[0.073]
Coalition	0.191***	0.182**	0.169**	0.020	0.041***	0.055***	-0.012	-0.001	0.002
	[0.065]	[0.075]	[0.065]	[0.015]	[0.014]	[0.016]	[0.016]	[0.014]	[0.014]
PolContinuous		-0.176**			0.029			0.060***	
		[0.074]			[0.018]			[0.019]	
LeftDPI			-0.107*			-0.016			0.035*
			[0.058]			[0.022]			[0.020]
RightDPI			0.159**			-0.015			-0.036*
			[0.073]			[0.020]			[0.018]
School enrollment tertiary				0.480***	0.551***	0.545***	0.520***	0.623***	0.504***
				[0.095]	[0.096]	[0.114]	[0.119]	[0.093]	[0.087]
Constant	2.439**	2.601*	1.964*	0.191	0.138	0.157	0.053	0.120	0.315**
	[1.108]	[1.297]	[1.090]	[0.133]	[0.133]	[0.188]	[0.140]	[0.129]	[0.146]
Observations	45	41	41	45	41	41	45	41	41
R-squared	0.763	0.769	0.827	0.983	0.989	0.988	0.989	0.989	0.990
Ideology Index	Portafke	PolContinous	LeftDPI RightDPI	Portafke	PolContinous	LeftDPI RightDPI	Portafke	PolContinous	LeftDPI RightDPI

Robust standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1

For each sector, three different political color variables are used: the Portafke ideology index, PolContinuous, and left and right dummies from DPI.

While a change in regime from right to left lowers the employment level in agriculture, it expands the employment level in industry and services. The results come from the coefficients of political color variables. For example, while the Portafke ideology index and employment in agriculture are negatively correlated, the Portafke index and employment in services are positively correlated.

Polcontinuous is a continuous variable where zero is right, one is center, and two is left. The variable's coefficient points out that a change from one to two reduces agriculture employment and increases services employment. Lastly, Left DPI and Right DPI are consistent with the above results. Therefore a shift in the government toward the left-wing generally reallocates labor out of agriculture and boosts the total factor productivity.

Moreover, the school enrollment rate in tertiary education has a positive impact on both employment in industry and services. While the coefficient of machine and transport equipment as a percent of value-added in manufacturing is negatively correlated with the employment in agriculture, it is positively correlated with employment in industry and services, which points out that the increasing production of machine and transport equipment pushes labor out of agriculture.

In line with the above results, an increasing amount of foreign direct investment reduces employment in agriculture. On the other hand, domestic credit to the private sector appears to positively affect employment in industry and services. At the same time, the coefficient of domestic credit to the private sector is insignificant for employment in agriculture.

The coefficient of population growth demonstrates that negative correlation between employment in services and population growth. The reason might be that the growing population can work in the agriculture sector instead of services since Turkey is a developing country. Lastly, the coefficient of the liberal democracy index illustrates a negative correlation between liberal democracy and employment in

industry and agriculture. This issue can be related to the argument that dictatorships may be preferable because of their ability to force savings, investment, and growth Isaksson (2007).

Aggregate productivity growth has two components. The first one comes from the productivity growth of individual firms by investing in better technology, employment of higher skilled labor, research and development, and innovation activities, and it is called within component. The second one is originated from the reallocation of factors of production from low to high productivity firms, which known as structural change Atiyas and Bakış (2020).

Table 11. OLS Results of Structural Change

	(1)	(2)	(3)
VARIABLES	Structural Change in Agriculture	Structural Change in Industry	Structural Change in Services
Left RPT	-0.119***	0.074*	0.054
	[0.041]	[0.038]	[0.046]
School enrollment primary	-0.031***	0.029**	0.023*
	[0.010]	[0.012]	[0.012]
Machinery and transport equipment	-0.075***	0.057***	0.033
	[0.024]	[0.020]	[0.022]
Foreign direct investment	0.072	-0.086	-0.069
	[0.074]	[0.063]	[0.070]
Domestic credit to private sector	0.005	-0.005	-0.002
	[0.004]	[0.004]	[0.004]
Trade of GDP	-0.005	0.004	0.002
	[0.005]	[0.006]	[0.005]
Population growth	-0.255	0.206	-0.022
	[0.213]	[0.224]	[0.277]
Liberal democracy index	0.667*	-0.481	-0.446
	[0.335]	[0.359]	[0.411]
Coalition	-0.050	0.018	0.051
	[0.088]	[0.082]	[0.092]
Constant	5.011***	-3.398**	-2.175*
	[1.193]	[1.477]	[1.265]
Observations	45	45	45
R-squared	0.412	0.293	0.133
Ideology Index	LeftRPT	LeftRPT	LeftRPT

Robust standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1

Table eleven illustrates the results of the different models in which dependent variables are between components of sectoral labor productivity. The coefficient of LeftRPT displays the negative correlation between two years after a change in government from right-wing to left-wing party and the structural change process in agriculture. This result might depend on two points: a shift in government from

right-wing to left-wing causes a drop in a change in the employment share of agriculture or a reduction in average productivity level. However, following the results of the total factor productivity and sectoral employment, it is known that a shift toward the left boosts agriculture's TFP and lowers agricultural employment. Thus, the negative correlation originated from the employment part, and this point makes the results consistent.

When we look at coefficients of other variables, the school enrollment ratio at primary school negatively affects structural change in agriculture. A higher primary school enrollment rate lowers the agricultural sector's structural change. Similar to results of sectoral employment, the coefficient of the machine and transport equipment is negatively correlated with the between component of agriculture and positively correlated with between component of the industry. Lastly, in the second model, the coefficient of the liberal democracy index points to a positive correlation between democracy and structural change in agriculture.

In conclusion, results of structural change-related models indicate a shift toward the left-wing party increases total factor productivity and between component of labor productivity in the industry, but it lowers the agricultural employment and between component of agriculture. Although some correlations have been reached by following the literature, establishing a structural model consists of some hardships in capturing the impact of the political dummy variable on the country's development process. For this reason, a non-structural methodology, the VAR model, is employed as a second methodology.

The VAR model was set by following Cholesky ordering. Models consist of three variables; ideology index, a political cycle-related variable such as academic freedom index, government investment expenditure, and total factor productivity or sectoral employment. The direct effect of the political color variable on other variables has been investigated by emerging models with the three variables mentioned earlier. The indirect effect has been checked by designing the model by introducing the political color dummy as exogenous to the VAR model.

The stationarity of the variables is necessary for establishing the VAR model. For an accurate understanding of whether the data is stationary or not, ADF unit root tests will be done. The next step is taking the difference of non-stationary variables. The optimal lag order has been chosen by following the Akaike-Schwarz criteria, and the white noise assumption of residuals has been checked.

Granger causality tests have been applied for each model, and the null hypothesis is ”X does not Granger causes Y”. Then, impulse-response functions and their graphs have been set to answer whether the effect of the political color variable exists on productivity or structural change.

Results of the VAR models take place in the appendices. Table 12 illustrates the results of the VAR model, which the Portafke Ideology Index introduces as an exogenous dummy variable. The first lag of military expenditure positively influences total factor productivity; the first lag of total factor productivity has a negative impact on military spending and transfer spending.

Table 13 shows the model's results in which all variables are endogenous and exogenous. The first lag of the academic freedom index positively correlates with the Potrafke ideology index, and the second lag positively influences total factor productivity. Additionally, the first lag of military expenditure positively correlated with total factor productivity.

Since most Granger causality tests imply no causality, results are not included here. Several combinations of variables have been checked in the IRF analysis, and Potrafke and other political color variables are introduced as endogenous and exogenous, respectively. The models, where the political color variable is endogenous, gave insignificant results, which are not shown in the results part.

On the other hand, figures six, seven, and eight show the model results where the Portafke ideology index introduces as an exogenous dummy variable. Impulse variables are picked from categories of government expenditures; response variables are different types of total factor productivity and sectoral employment. Even though most of the results are insignificant, figure six tells that when there is one standard

deviation shock to the general government final consumption, it decreases the difference in total factor productivity in step zero.

Figure seven illustrates that when there is one standard deviation shock to the military expenditure, it increases the difference in total factor productivity in step one. Figure eight displays that when there is one standard deviation shock to the transfer expenditure, it decreases the difference in total output per worker in step zero.

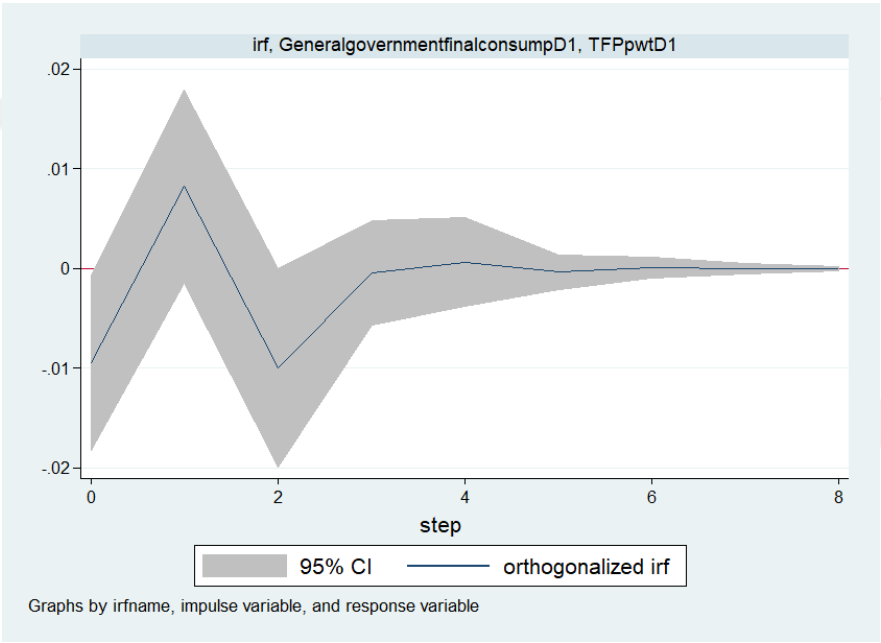


Figure 6. IRF of general government final consumption and TFP

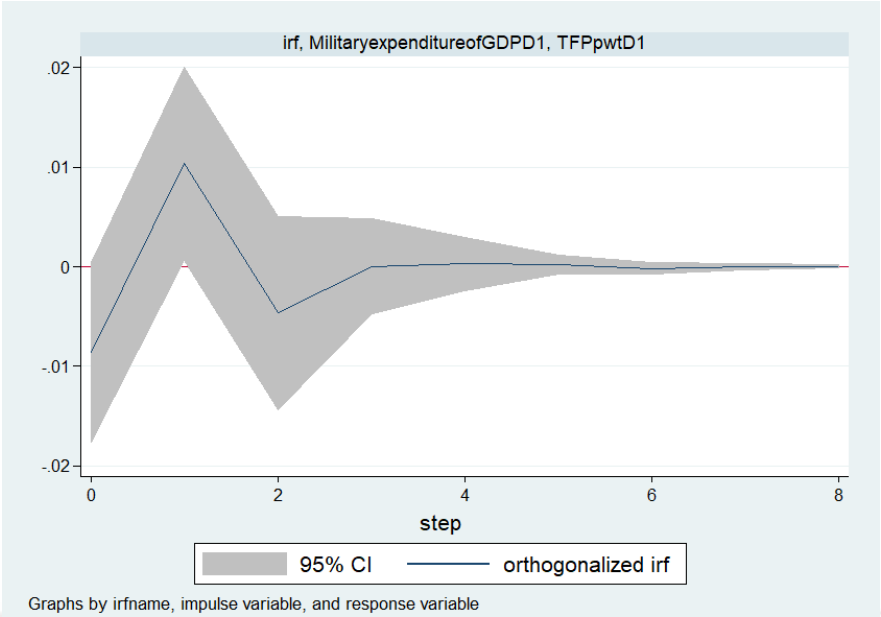


Figure 7. IRF of military expenditure and TFP

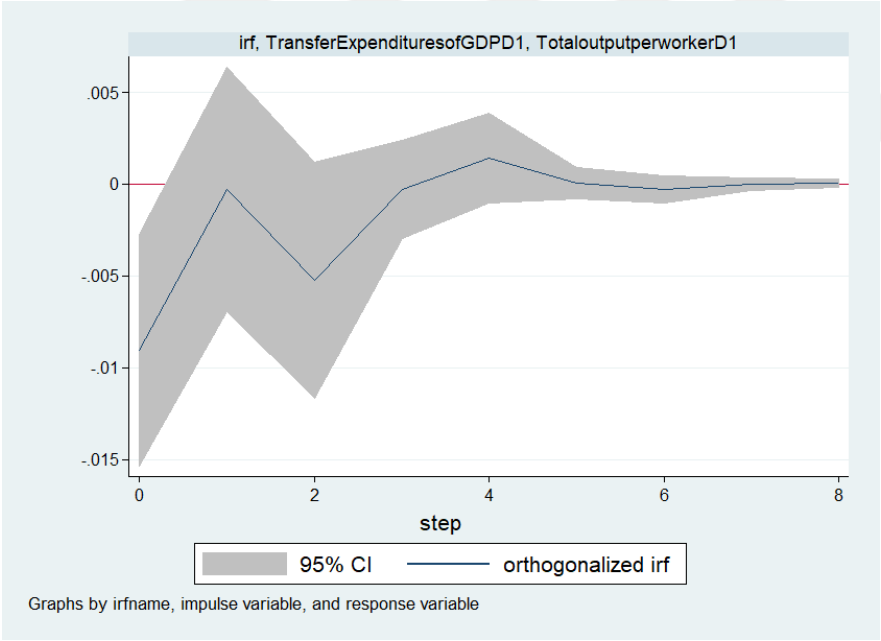


Figure 8. IRF of transfer expenditure and total output per worker

CHAPTER 6

CONCLUSION

The literature has many studies on both political business cycles and structural change separately, but the articles that unite these two issues are relatively rare Aray (2016) , Isaksson (2007). The article's motivation is to investigate the possible effect of the politically induced nominal shocks on the development process of Turkey from 1960s to 2020s. Politically induced shocks emerge from either re-election purposes of the incumbent party or different policy objectives of parties, such as giving more priority to low unemployment than low inflation as a left-wing party.

Turkey has experienced several short-term coalition governments and long-term majority governments. Both have advantages and disadvantages to manipulating policy tools, but it is assumed that Turkey has suffered from those manipulations as a developing country. Furthermore, this paper aims to highlight manipulations affecting the country's long-term development process.

In this research, results imply the presence of the political business cycles in Turkey between the 1960s and 2020s. While a shift from right-wing party to left-wing party increases the growth of academic freedom and spending of the ministry of culture and health, it lowers military expenditure and spending on religious affairs. However, if the government is formed as a coalition with several parties, it creates an increase in the growth of the transfer expenditure.

Furthermore, a shift in the governance from left to right increases TFP in constant prices, TFP with capital share $\alpha = 0.33$, TFPagriculture, and TFPindustry. Furthermore, if the government is a short-term coalition government, it negatively influences the total factor productivity. While a change in regime from right to left lowers the employment level in agriculture, it expands the employment level in industry and services. Lastly, the negative correlation between two years after a change in government from right-wing to left-wing party, and the structural change process in agriculture has been noticed in the analysis.

APPENDIX

VAR RESULTS

Table 12. VAR Results, Potrafke Ideology Index Exogenous

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Academic Freedom Index D1	TFP pwt D1	Military expenditure D1	TFP pwt D1	Transfer expenditures D1	TFP pwt D1
L.Academic freedom index D1	0.263*	-0.046				
	[0.150]	[0.090]				
L2.Academic freedom index D1	-0.065	0.109				
	[0.143]	[0.086]				
L.TFP pwt D1	0.086	-0.142	-3.183**	-0.078	-0.623*	-0.168
	[0.231]	[0.139]	[1.621]	[0.144]	[0.345]	[0.145]
L2.TFP pwt D1	0.019	-0.079	-1.967	-0.017	-0.075	-0.089
	[0.230]	[0.138]	[1.591]	[0.141]	[0.361]	[0.152]
Portafke ideology index	0.008	-0.004	-0.096	-0.001	0.018	-0.002
	[0.011]	[0.007]	[0.065]	[0.006]	[0.014]	[0.006]
L.Military expenditure D1			-0.237*	0.024*		
			[0.141]	[0.013]		
L2.Military expenditure D1			-0.055	-0.006		
			[0.142]	[0.013]		
L.Transfer expenditures D1					0.167	-0.000
					[0.142]	[0.060]
L2.Transfer expenditures D1					-0.241*	-0.028
					[0.133]	[0.056]
Constant	-0.022	0.007	0.178	-0.001	-0.035	0.002
	[0.027]	[0.016]	[0.152]	[0.014]	[0.034]	[0.014]
Observations	57	57	57	57	57	57
Ideology Index	Portafke	Portafke	Portafke	Portafke	Portafke	Portafke
Year	All	All	All	All	All	All

Standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

Table 13. VAR Results, Potrafke Ideology Index Endogenous

VARIABLES	(1) Portafke ideology index	(2) Academic freedom index D1	(3) TFP pwt D1	(4) Portafke ideology index	(5) Militarye expenditure D1	(6) TFP pwt D1	(7) Portafke ideology index	(8) Transfer expenditures D1	(9) TFP pwt D1
L.Portafke ideology index	0.457***	-0.005	-0.007	0.603***	0.033	-0.002	0.582***	0.015	-0.004
	[0.125]	[0.011]	[0.007]	[0.125]	[0.071]	[0.006]	[0.119]	[0.015]	[0.006]
L2.Portafke ideology index	-0.137	-0.008	-0.004	-0.175	0.016	-0.005	-0.198*	-0.013	-0.002
	[0.109]	[0.010]	[0.006]	[0.117]	[0.067]	[0.006]	[0.113]	[0.014]	[0.006]
L.Academic freedom index D1	3.970**	0.297**	-0.063						
	[1.591]	[0.144]	[0.085]						
L2.Academic freedom index D1	1.434	0.033	0.157*						
	[1.687]	[0.152]	[0.090]						
L.TFP pwt D1	0.300	0.060	-0.162	0.313	-3.093*	-0.090	1.714	-0.624*	-0.182
	[2.577]	[0.233]	[0.138]	[2.925]	[1.669]	[0.144]	[2.829]	[0.351]	[0.147]
L2.TFP pwt D1	2.452	0.010	-0.108	3.479	-2.050	-0.029	4.673	0.001	-0.097
	[2.549]	[0.230]	[0.137]	[2.871]	[1.638]	[0.141]	[2.878]	[0.357]	[0.149]
L.Military expenditure D1				-0.074	-0.186	0.025*			
				[0.260]	[0.149]	[0.013]			
L2.Military expenditure D1				0.171	-0.031	-0.008			
				[0.261]	[0.149]	[0.013]			
L.Transfer expenditures D1							1.043	0.183	0.002
							[1.152]	[0.143]	[0.060]
L2.Transfer expenditures D1							0.831	-0.217	-0.024
							[1.090]	[0.135]	[0.056]
Constant	1.509***	0.027	0.023	1.254***	-0.141	0.013	1.345***	0.001	0.011
	[0.310]	[0.028]	[0.017]	[0.305]	[0.174]	[0.015]	[0.301]	[0.037]	[0.016]
Observations	57	57	57	57	57	57	57	57	57
Ideology Index	Portafke	Portafke	Portafke	Portafke	Portafke	Portafke	Portafke	Portafke	Portafke
Year	All	All	All	All	All	All	All	All	All

Standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1

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