

**ECONOMIC ANALYSES OF POLITICAL BUDGET
CYCLE AND INTEREST GROUP POLITICS**

Thesis submitted to Jawaharlal Nehru University
for award of the degree of
DOCTOR OF PHILOSOPHY

by
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December 21, 2017

DECLARATION

I declare that the thesis entitled “**Economic Analyses of Political Budget Cycle and Interest Group Politics**” submitted by me for the award of the degree of Doctor of Philosophy of Jawaharlal Nehru University is my own work. The thesis has not been submitted for any other degree of this University or any other University.

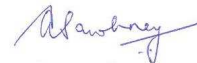

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Dedicated to My Beloved Parents,
DARSHAN MANJHI and SOMARI DEVI

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“A University stands for humanism, for tolerance, for reason, for the adventure of ideas and for the search of truth. It stands for the onward march of the human race towards ever higher objectives. If the University discharges their

duties adequately, then it is well with the Nation and the People.”

(Pt. Jawaharlal Nehru)

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- Manjhi, G. and Mehra, M. K. (2016). Dynamics of Political Budget Cycle. *NIPFP Working Paper*, No. 163, 2016. <https://ideas.repec.org/p/npf/wpaper/16-163.html>.
- Manjhi, G. and Mehra, M. K. (2017). The Centre-State Political Transfer Cycles . *CITD, Discussion Paper, JNU*, No. 17-01, 2017. <https://ideas.repec.org/p/ind/citdwp/17-01.html>.

- **Other Publications**

- Alda, V and Manjhi, G. (2016). Can India Learn from Korean Inflation Targetting and Monetary Transmission Mechanism? In Narsimhan, S. and Do-Young, Kim (Eds.), *Evolving Indo-Korea Relations: Perspectives on South Asia*, (pp. pp.26-49). Manak Publications (New Delhi), ISBN 978-93-7831-419-3.
- Manjhi, G. (2015). The Political Economy Trilemma of India and Korea. In Narsimhan, S. and Do-Young, Kim (Eds.), *Deepening India-Korea relations : towards a sustainable future*, (pp.69-91). Manak Publications (New Delhi), ISBN 978-93-7831-386-8.

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LIST OF ABBREVIATIONS

- AFPM:** Active Fiscal Passive Monetary
- AMA:** American Medical Association
- ARDL:** Auto-regressive Distributed Lag
- BJP:** Bharatiya Janata Party
- CVH:** Current Value Hamiltonian
- DFE:** Dynamic Fixed Effects
- FRBMA:** Fiscal Responsibility and Budget Management Act
- FC:** Finance Commission
- Gfc:** Grants from the Centre
- GDP:** Gross Domestic Product
- GMM:** Generalized Methods of Moments
- GSDP:** Gross State Domestic Product
- INC:** Indian National Congress
- Lfc:** Loan from the Centre
- MDM:** Mid Day Meal
- MG:** Mean Group
- MSP:** Minimum Support Price
- NDA:** National Democratic Alliance
- NGDP:** Nominal Gross Domestic Product
- NSDP:** Net State Domestic Product
- NITI:** National Institution for Transforming India
- OECD:** The Organisation of Economic Co-operation and Development
- OLS:** Ordinary Least Squares

PBC: Political Budget Cycle
PMG: Pooled Mean Group
PSUs: Public Sector Undertakings
PTC: Political Transfers Cycle
RBI: Reserve Bank of India
SSA: Sarva Shiksha Abhiyan
SIG: Special Interest Group
SVF: Scrap Value Function
Td: Tax Devolution
UPA: United Progressive Alliance
US: United States
USA: United States of America
UK: United Kingdom
WPI: Wholesale Price Index
WTO: World Trade Organisation

ABSTRACT

The discipline of economics and politics go hand-in-hand, and it is almost as if the two have been born together. A very relevant example that brings out this complementarity between economics and politics is the concept of democratic politics, which is a platform where political dimension of economics and economic dimension of politics interact in various ways. The ultimate imagination of the democracy is 'all things bright and beautiful', and in reality this is not the case. In fact, there are a lot of factors in the positive concept of democracy that contradict and prevent it from the achievements of the objectives of the people in a country. For example, the political leaderships, in general, are understood as a benevolent leader in the economy who will maximize the welfare of the society and the country however, she/ he might end up maximizing her/ his own objectives. Rather, in most of the cases in any democracy, the objective of any leadership is to win the election and there are many socio-economic/non socio-economic factors that are used to fulfill their objectives. Among these, one of the most important factors is, the economy itself. That is, economic variables are one of the prime determining factors of political parties' objectives. Similarly, the presence of special interest groups in the democracy is at least as old as the democracy itself and, hence, these groups too play a very significant role in the electoral democracy. Consequently, the politics and economics are endogenous to each other. Effectively, this thesis unfolds the aspect of election cycles and interest group politics under the broad area of political economy. More specifically, this thesis is grounded in the area of political budget cycles of different types, convergence of the opportunistic and partisan cycles, political transfer cycles in the federal structure of the country, and the conceptualization and analysis of quid pro

quo kind of relationship between the government and the special interest groups. A synopsis of each of these aspects covered in the individual chapters is provided below:

In the first technical chapter of the thesis, that is Chapter 3, we set up model to capture the Political Budget Cycle (PBC) in terms of the opportunistic and partisan behavior of the government, using fiscal policy during the electoral term. Utilizing the method of optimal control to maximize the objective function of the political parties/politicians, we derive the results and capture the time path of the fiscal deficit and the voting support in different phases of the electoral term. The basic results show that the opportunist and partisan cycles follow a similar time path, albeit, the former is more pronounced than the latter, especially prior to the election period. The voters render a positive voting support in case of both opportunist and partisan incumbents, but the presence of anti-incumbency entails a rejection of the same in the opportunist case. An acceptable high deficit is not bad for the modern economy as such, however, creating a budgetary deficit above a threshold will be costlier in the opportunistic case than the partisan one, that is, the deviation of the budgetary deficit from the benchmark will be more pronounced in the case of an opportunistic incumbent than a partisan incumbent. That is, the votes garnered per unit of deficit incurred would be less in the opportunistic case than in the partisan one.

India is the biggest democracy in the world, but the understanding of the significance of political ideologies on the economic policy positions and its implementation needs to be strengthened. There are specific characteristics of political parties that define them as left, right and the center. Moreover, the political parties are not always tied to their ideology and partisan behavior. An empirical test of the findings of Chapter 3 is done in Chapter 4, where we attempt to study the opportunistic and partisan behavior of the governments in India with respect to fiscal policies for both the union and the state elections. The major question that is explored here is: whether there is convergence in opportunistic and partisan cycles with respect to different fiscal policy variables, namely, fiscal deficit (gross fiscal deficit, primary deficit and revenue deficit), expenditure (aggregate expenditure, revenue expenditure, capital expendi-

ture and social sector expenditure) and revenue (aggregate revenue, revenue receipts, capital receipts, tax revenue, non-tax revenue and sales tax)? Using the method of ordinary least squares, the basic findings of the chapter indicate that ideological differences and its reflections in the economic policy are more visible at the national level elections and not at the assembly level ones. Similarly, the opportunistic behavior of the parties is more visible in the parliamentary election and not in the assembly elections. There exists a strong PBC in all the deficit heads, aggregate expenditure, aggregate revenue, revenue receipts, tax revenue and sales tax with the union level of elections. However, except capital expenditure and sales tax, none of the variables show a significant PBC for the state level elections. Further, analyzing the union level election, there is center-left-wing partisan and opportunist convergence in all the deficits heads. There is strong center-left partisan and the opportunist government convergence in the aggregate expenditure and capital expenditure, whereas a weak convergence of revenue expenditure in the case of the right-wing partisan and the opportunist government is found. Similarly, the center-left-wing partisan behavior converges with the opportunist government in the case of revenue receipts, tax revenue and non-tax revenue. At the state level, convergence is not very strong. That is, there is no convergence in opportunistic and partisan behavior of any party in deficits, whereas there is weak convergence in aggregate and revenue expenditure for the right-wing. Further, the right-wing opportunistic and partisan behaviors converge in the case of revenue receipts and tax revenue.

The empirical investigation of the PBC has been further explored in terms of the strategic transfer of the resources from the union to the states in Chapter 5, known as the Political Transfer Cycles (PTC). This chapter has been divided into two parts: the first trace and checks whether the politically motivated transfers help the incumbents win the elections. The transfer variables under the study are: grants from the center (Gfc), loans from the center (Lfc) and Tax Devolutions (Td). In first part of the chapter, we assess the PTCs in Gfc , Lfc and Td using the method of Pooled Mean Group (PMG) in an ARDL framework. This method provides both, the short and the long run analyses. The basic results state that the PTCs in Lfc can be traced in the

year before the election for the parliamentary elections, but these occur in the year of the election for the assembly elections, whereas, *Gfc* cycles are found in the year before the assembly elections only. No clear cycles have been traced in the case of *Td*. This finding is similar to the literature on PBC, such as that found in [Aidt, Veiga, and Veiga \(2011\)](#), [Drazen and Eslava \(2010\)](#), [Klomp and De Haan \(2013b\)](#), [Chortareas, Logothetis, and Papandreou \(2016\)](#) etc. The right-wing and coalition incumbent have the tendency to transfer less to the states, however, the former provides more grants to the states in the year of assembly elections than the latter. Additionally, if there exists the same party rule at the state level, or if the state is an ally of the center, the allied state receives more rewards from the center in the form of *Gfc* and *Lfc*. For the second part of the chapter, we use the Logit method to assess whether the politically motivated transfers help the incumbent win the elections. The basic findings of the result state that there are not very strong results of politically motivated transfers that affect the victory of the incumbent for both, parliamentary and assembly elections. However, the opportunistic manipulations of *Gfc* in the year before the parliamentary election, and *Lfc* in levels for both, the parliamentary and the assembly elections, can help the incumbent to regain its power. Additionally, inflation is harmful for the incumbent as it increases the likelihood of losing the election. However, a higher voters' turnout is more likely to help in winning the election for the incumbent, and a more experienced government has a higher probability of winning the election. Similarly, a right-wing government is more likely to win the election, whereas the presence of a coalition government, in general, reduces the winning possibility in both, the parliamentary and the state elections.

Lastly, we explore the quid pro quo kind of relationship between industrial interest group and the political parties/ politicians. In this context, Chapter 6 explores through theoretical analysis, the endogenous relationship between political parties/ politicians and a special interest group (SIG) in a dynamic-game framework. This is also an extension of the work by [Lambertini \(2001, 2014\)](#). Considering differential games, where there are two players or political parties/ politicians who contest the election in the presence of voters and SIG, the private optimum pay-offs for the

individual players are maximized in a non-cooperative game context. In this game, political parties offer the expenditure on public good in the economy and regulatory benefit to the SIG. The respective return in doing so is the voting support from citizen voters and financial contribution (of bribe) for election campaign by the SIG. The open-loop Nash equilibrium solutions imply that the commitment to its own plan of action by the parties, given the initial state and time, results in the same outcome even if the political parties change their strategy based on the state at every point in time. That is, the closed-loop equilibrium collapses to the open-loop equilibrium, and it is found to be a saddle point equilibrium. The offer of expenditure on the public good is higher if the unit voting support is higher. The offer of higher expenditure also requires a correspondingly larger lump-sum tax and higher withdrawal of voters relative to the discount factor (at which the accumulation of net voting support and financial contribution received build up). Further, if the unit voting support and financial contribution to first party are higher than the second one, and the voting support and financial contribution withdrawal is higher than the discount factor at which the accumulation of the net benefit of voting support and net financial contribution build up, political parties will offer a positive and higher expenditure on the public good and render a positive regulatory benefit in order to seek a larger share of voting support and financial contribution. The lower unit cost of the offer of expenditure on public good and regulatory benefit enhances the offer of higher expenditure and regulatory benefit to receive a larger voting share and financial contribution. The higher financial contribution of bribe also provides a higher regulatory benefit to the SIG and larger voting share to the political party. That is, the voting support and financial contribution received by first party will always be higher than the second one if the per unit voting support and per unit financial contribution of bribe are higher for first party than the second one. Further, a comparison of the non-cooperative outcomes with those under cooperation entails that the solutions at the private optimum are always higher than at the social optimum. That is, the offer of the expenditure on the public good is exaggerated above the cooperative level, and hence, voters vote retrospectively to the party which overspends more. Similarly, the

excessive distortion of private optimal regulatory benefit helps the political parties to receive higher financial contribution than what is socially desirable. Also, the optimal solutions at the private and social optimum constitute a steady state saddle point equilibria.

CHAPTER 1

Introduction

1.1 Background

The relationship between economics and politics is as old as the evolution of democracy or even older. The democracy took birth around 5th to 4th century BC in Athens.¹ Since then, the democratic process have been evolving with greater strength as never before, and one can think about it in terms of a normative concept, as Plato has said,

“It is stored up in heaven but unhappily has not yet been communicated to us.”(Crick, 2002).

The democracy, what it ought to be, is a normative concept, where everyone enjoys their rights and privilege to the full. However, in democracy as it is today, ‘not all is bright and beautiful’ as one believes under a normative concept. In reality, no country is at its democratic bliss and ‘one man one vote’ is just the beginning of the route to democracy. As a positive concept, the political institution of democracy has been shaped by various economic and non-economic factors. In fact, there are various socio-economic, political, psychological, religious factors to count a few, which can affect the functioning of the democracy, where, the power and authority is not always be held by a benevolent social planner. Instead the social planner might be working

¹The Athenian leader Cleisthenes introduced a system of political reforms that he called *demokratia*, or ‘rule by the people’ in the year 507 BC.

for self interest, or under various constraints that are not consistent with democracy. In such cases, there exists the possibility of emergence of election cycles under the influence of political motivations.

The proposed thesis covers various aspects of economic cycles created in the face of electoral competition and interest group politics under the broad rubric of ‘political economy’.² Earlier, the discipline of Economics was popular more as ‘Political Economy’, particularly from the Adam Smith’s ‘An Enquiry into the Nature and Causes of the Wealth of Nation’ (1776) to John Stuart Mill’s ‘Principles of Political Economy’ in 1848 or little before. It was believed that Economics is non-separable from Politics. The older view states that the political factors are very important in determining economic outcomes; however, some of the recent focus is on the economic factors themselves that are no less crucial in determining political outcomes. Consequently, both seem to be endogenous in nature. Today, though both the disciplines are distinct, none are free from the influence from each other. In general, economics is the study of optimal use of scarce resources whereas, political economy begins with the political nature of decision making and is concerned with how politics will affect economic choices and allocations in an economy. Whereas, the term ‘politics’ is mostly used in correspondence with ‘power’ and ‘authority’, and the exercise of it. The question of power and authority are relevant only when there is heterogeneity of interests. That is, a conflict of interest between economic actors in society. To reduce the conflict of interest, an individual leader/ party tries to gain political power through her/ his ability, and citizenry explicitly chooses/ appoints someone to make decisions on its behalf. The actual economic policies implemented are different from optimal policies, depending on the ability and objective of a party/ politician who is seeking power and authority. The political constraints are mostly due to the conflict of interest, and for this, collective choices have to be made under conflict. The positive political economy, thus, raises a question - how political constraints may

²The term ‘political economy’ has been originated from the work by Montchrestien in 1615 on ‘Treatise on Political Economy’. Later, used by Sir James Steurt (1761) in his book ‘An Enquiry into the Principles of Political Economy’.

explain the choice of policies that differ from optimal, and may result in positive political economic outcomes rather than the best welfare normative outcomes. More recently, the new term coined is 'new political economy' which is precisely a modern political economic approach that relies on use of rigorous mathematical methods that permit analysis of political economic concepts in terms of optimization, incentives, constraints, ideology etc.

In the light of above interactions between politics and economics, in fact, more than 40 years of research in political economic cycles (spanning the last quarter of the 20th century to the beginning of the first quarter of 21st century) finds that, politics significantly affects economic decision making, and hence, economic outcomes. This subject has largely flourished in the interface of macroeconomics, game theory and social choice theory. The specific interests of the researchers have been, aspects relating to the following - business cycles, inflation, unemployment, conduct and implementation of stabilization policies, governance structures, government and special interest groups, inequality and economic growth, instability and conflict, the origin of persistent budget deficits etc. Though, the political economy aspects cover a wide range of politics, economics, social, ideological, science and technology etc. (which can be further disaggregated as - interaction of politics and economics with respect to institutions, accepted laws and rights with respect to the constitutions, decision making with respect to economic policies, politics of distributive justice, economics of interest group politics, political economy related to ideology, distributive politics in federal structure of the country etc.), the specific aspects that occupy center-stage in this thesis are - searching for possibility of creation of economic cycles before the election, tracking whether partisan behavior of the incumbents is uniform across the electoral term or differs in an opportunistic way, presence of federal transfer cycles and strategic opportunistic and partisan behavior of the political parties and politicians and, finally, quid pro quo interaction of political parties/ politicians with a special interest group. In the political-economic interaction, Keynes believed that:

“capitalism, wisely managed, can probably be made more efficient for attaining economic ends than any alternative system yet in sight, but that in itself it is in many ways extremely objectionable. Our problem is to work out a social organisation which shall be as efficient as possible without offending our notions of a satisfactory way of life.”(Keynes, 1926)

To substantiate this argument, it is necessary to have the right level of government regulatory intervention in the market. The classical economists do not negate the fact that fluctuations can affect aggregate economic activity, but they believe in the self-correcting mechanism of the market within a feasible time limit. Keynes had already started questioning the functioning of the laissez-faire system prior to the Great Depression (1929-30), where in; he denied the concept of capitalist market to function well. Keynes stated that, the honest management of capital market is a practical solution for large fluctuations in the aggregate economic activity. Hence, after experiencing the economic downfall during the Great Depression, the orthodox Keynesian view evolved, which stated that market economies are inherently unstable, and these instabilities in the economy create welfare reducing fluctuations in aggregate output, and employment (Snowdon and Vane, 2005). Consequently, ‘old’ Keynesians argued that instability can and should be corrected by discretionary monetary and fiscal policies (Modigliani, 1977).

Kalecki (1943) challenged this Keynesian approach of the capitalist view by proposing the Marxo-Keynesian model, where a partisan government functions as the life jacket for capitalist interests by deliberately creating economic recessions. These recessions are created to protect the capitalist interests from the threats to its profit because of increased bargaining power of labor, wherein this bargaining power may have come about due to consistent full employment over long periods of time. Downs (1957) argued, since the ambitions of the government reflected in its economic decisions, it should be viewed as endogenous in macroeconomic models. A collection of the above views led to the discourse on political economic cycles or political business cycles. Chapter 1 has been divided in the following way. The scope of the research has been

analyzed in Section 1.2. Section 1.3 analyzes the background, methods and basic results of the dynamics of political budget cycle (Chapter 3). Section 1.4 explains the background, data and methods and basic results of whether partisan and opportunist cycles converge in the context of India (Chapter 4). The background, data and methods and basic results of Chapter 5 on center-state political transfer cycles in the case of India have been analyzed in Section 1.5. Section 1.6 presents a background, methods and basic results of Chapter 6, which is on a dynamic analysis of special interest politics and electoral competition and finally, Section 1.7 concludes Chapter 1.

1.2 Scope of the Research

‘Nothing is apolitical’ is the term often been used in different debates and discussion, and in that sense, there is no dearth of the scope of the research in ‘political economy’. That is, this area is always new even though this is one of the oldest as a discipline. Broadly, this thesis analyzes various aspects of political business cycles, with focus on the political budget cycles (PBC) and interaction between politics and special interest groups. The first technical chapter (Chapter 3) is on the ‘dynamics of PBCs’. There is hardly any work in this area which analyzes the dynamics of PBC in an optimal control set up with clear parametric demarcation between opportunism and partisan fiscal policy behavior of the incumbent. The second technical chapter (Chapter 4) is an empirical analysis of whether the opportunistic and partisan cycles converge in the Indian context. One of the most worked upon issues in political business cycles literature is due to opportunistic manipulations. However, there can be the possibility of strategic opportunist and partisan cycles which might be difficult to differentiate from each other. Here, we attempt to capture these two behaviors through different fiscal policies in their electoral terms. The third formal chapter (Chapter 5) is on the possibility of politically motivated transfers to its provinces, and whether these help the incumbent retain political power. There is lack of research on this in the context of the developing countries, which would address strategic transfers of resources from

the central government to its provinces. The fourth technical analysis (Chapter 6) is a theoretical dynamic analysis of special interest politics and electoral competition. Again, the dynamics of the quid pro quo kind of relationships between the political parties and special interest group along with voters have not been worked out as an optimal control problem. Also, there are hardly any papers that explain the costs to the economy due to this kind of relationship, and provide us the gap to work further on it. Though, our research might seem like a tip of the iceberg, but the contribution made by it is significant in terms of both theoretical and empirical analyses. Each of these technical chapters is now discussed below.

1.3 Dynamics of Political Budget Cycles

1.3.1 Background

The first technical chapter of the thesis is Chapter 3. This tracks the dynamics of PBCs drawn from the basic idea of political business cycles. The evolution of a political business cycle can be divided into first generation (1970s) and second generation (in late 1980s, 1990s and 2000s) models. These two types of models can be critically divided into two broad categories: opportunistic or partisan. Further, these could relate to the behavior of the incumbent politician who relies either on adaptive expectations or rational expectations. The opportunistic incumbent does not have any specific policy preferences, whereas a partisan incumbent attempts to win the elections while adopting its preferred policies. Often, in the opportunistic models, the behavior of the incumbent might be helpful to get her/ him back into power.

Although the concept of a political business cycle was introduced by [Kalecki \(1943\)](#), it was re-invented by [Nordhaus \(1975\)](#) based on the idea of the former. There are also important breakthrough works by [Kramer \(1971\)](#), [Tufte \(1975\)](#) and [Fair \(1978\)](#) that examine the economic determinants of US congressional voting. [Nordhaus \(1975\)](#) is based on an opportunistic pre-electoral manipulation of economic policies by the in-

cumbent to increase the chances of getting re-elected, whereas, [Hibbs \(1977\)](#) explained the post-electoral cycles due to different macroeconomic goals of policy makers, popularly known as partisan cycles. [Alesina \(1987\)](#) considers the concept of rational expectations with partisan political cycles as against the adaptive expectations in his earlier work. [Drazen \(2000\)](#) states that the visibility of economic cycles would be enhanced by incorporating fiscal variables in the first generation models, in both theory and empiric. In fact, most of the recent research work, such as [Rogoff and Sibert \(1988\)](#) and [Rogoff \(1990\)](#), tries to explain the economic cycles by including both monetary and fiscal variables in the model and, hence, the evolution of the concept of political budget cycle (PBC). The variants of these models have been tested in the Indian context by [Chaudhuri and Dasgupta \(2006\)](#) and [Khemani \(2004\)](#) whereas, [Aidt, Veiga, and Veiga \(2011\)](#) analyze the PBC in the case of Portuguese mainland municipalities under the opportunistic behavior of an incumbent.

1.3.2 Motivation

A PBC can be driven by two kinds of behavior of the political party/ politician – partisan and opportunistic. A political business cycle within a partisan framework states that different political parties have a clear preference for specific macroeconomic objectives, and the fluctuations in the macroeconomic variables are a consequence of politicians having different policy objectives. An opportunist politician does not have any specific policy objective, except the desire to win the elections. So, opportunist political business cycles are expansions in economic activity propelled by opportunistic behavior of an incumbent immediately before an election, so as to increase the chances of getting re-elected.

Generally speaking, benevolent policymakers are postulated to maximize social welfare by relying on a range of policy instruments. However, there might be some self-interested politicians whose macroeconomic objectives are inherently conflicting, which can result in a PBC. The political cycles are characterized in terms of macroeconomic variables, such as output, unemployment, budget components of revenue

and expenditure and inflation induced by the electoral cycles. In today's modern economies, most of the countries are running a fiscal deficit (particularly close to the election), among which many might be due to politically motivated expenditure and revenue receipts and this is one of the motivations which encouraged us to further look for the reasons of economic cycles close to the elections.

1.3.3 Method and Basic Results

In the first substantive essay of this thesis, in Chapter 3, we theoretically analyze the PBC both, under opportunistic and partisan behavior of the incumbent, where she/he tries to maximize the utility function from voting support net of the deficit in the economy. This refers to the cycle in some constituents of government budget, induced by electoral motive. In particular, this might take the form of an increase in government expenditure, reduction in taxes, increase in budget deficit etc. just prior to the election date, which enhances an incumbent's chances of win. The analysis has been done under two broad categories of behavior of an incumbent, namely, opportunistic and partisan. Using the method of optimal control, when an incumbent politician derives utility from voting support and dis-utility from budgetary deficit, the equilibrium time paths of both voting support and budgetary deficit are characterized in a finite time horizon under complete information. The incumbent politician may be an opportunist, in that she/he is interested in garnering votes for herself/himself, and manipulates budgetary deficit to achieve this, or else she/he may be partisan, that is, characterized by heterogeneous preferences, reflecting preferences for specific economic policies.

To capture the time path, numerical simulations have been deployed. The opportunism has been captured by the smaller values of ϵ (intertemporal elasticity of substitution) and δ (the weight assigned to the deficit incurred vis-à-vis voting support gain by the incumbent) whereas, higher parametric values have been assigned for ϵ and δ to capture partisan. The basic results from simulations in Chapter 3 state that, the citizen-voters vote for the opportunist as well as the partisan incumbent.

However, they reject the same when there is a sufficiently strong anti-incumbency in the opportunist case. The level of voting support obtained in case of both opportunist and partisan is found to be positive and rising over time, but running the budgetary deficit will be costlier for the economy in the former case than the latter. Also exceeding the threshold fiscal deficit can be punished by citizen-voters in the opportunistic case.

The next chapter constitutes, in some sense, an empirical test for India for the results in Chapter 3. It tries to capture the opportunistic and partisan behavior through the actual policies implemented in the economy at different point of time during the electoral term.

1.4 Do Partisan and Opportunist Cycles Converge? An Empirical Evidence from India

1.4.1 Background

Chapter 4 is an empirical extension of Chapter 3, therefore, the underlying literature and motivation of the previous sections will be applicable even in this case. This chapter focuses on answering, ‘do opportunist and partisan cycles converge? an empirical evidence from India.’ The opportunism and partisaneering are two important political motivations for political parties or politicians. Due to an opportunistic motivation, an incumbent follows expansionary policies close to the election to show the brighter side of its governance so as to attract a larger share of the votes for winning the election. This concept is famously known as the political business cycle, initially propounded by Nordhaus (1975). The earlier notion of the political business cycle was based on the opportunistic manipulation of the economic variables relating to an exploitable Phillips curve; where an incumbent attempted to create lower unemployment and higher output close to the election, thus, increasing the chances of winning the election. This very concept of opportunistic model of political business cycles

was further popularized as PBC by [Rogoff and Sibert \(1988\)](#), [Rogoff \(1990\)](#), [Persson and Tabellini \(1990, 2003\)](#), [Drazen \(2000\)](#), [Shi and Svensson \(2002b\)](#), [Brender and Drazen \(2005\)](#), [Aidt, Veiga, and Veiga \(2011\)](#) etc. Also, the incumbent political party can decide to implement its partisan economic policy close to the date of election. In that case, it can be very difficult to differentiate between these two types of political motivations and, hence, there is a possibility of convergence of opportunism and partisan.

1.4.2 Motivation

By motivating through the notion of opportunist and partisan behavior, we raise the questions: is there a clear distinction between the two concepts, where one always behaves opportunistically and the other as partisan? In consonance, whether the party behaves like an opportunist when she/ he is in office and partisan otherwise? In fact, yes, as [Frey and Schneider \(1978a\)](#) conclude. Even though these two concepts are defined distinctly, there is a possible intersection between the two, for example - partisan can implement its partisansneering type policies close to the election, and it might be difficult to understand whether this could be ascribed to partisan behavior or the opportunist. In fact, well before the election, stiff political competition can lead to identical (or near identical) political position ([Alesina and Rosenthal, 2000](#)). In such scenarios as well, the partisan and opportunistic behavior could converge. [Manjhi and Mehra \(2016\)](#) conclude that opportunistic and partisan cycles follow a similar time pattern where the cycle is more pronounced in case of the former just prior to the election. In addition, opportunistic cycle is more costly for the economy as a whole even though, that helps better in winning the election than a partisan one.

1.4.3 Method and Basic Results

This chapter explores the behavior of the government in office in terms of how it uses different fiscal policy instruments. The specific questions for which answers

are sought are: whether the incumbent's economic behavior with respect to budget deficit (gross fiscal deficit), expenditure (aggregate expenditure, revenue expenditure, capital expenditure and social sector expenditure) and revenue (aggregate revenue, revenue receipts, capital receipts, tax revenue, non-tax revenue and sales tax) variables is consistent throughout the electoral term or does it change with its motivation in different time and individuals? Some attempt has already been made to look at partisan and opportunistic cycles and whether these cycles have a similar time path (Klein, 2014)? In fact, Klein (2014) confirms the simultaneous occurrence of opportunistic and partisan cycles Brazil. We use the method of Ordinary Least Squares (OLS) fixed effects models for our analysis utilizing a balanced panel-data from 1980-81 to 2010-11 for 16 Indian states.

The basic results of Chapter 4 are that: the ideological differences and its reflection in India's economic policy are more visible at the national level elections and not at the state level. The opportunistic behavior of the political parties is also more visible in the parliamentary elections and not at the assembly elections. There exist strong PBC in all deficit heads, aggregate expenditure, aggregate revenue, revenue receipts, tax revenue and sales tax with respect to the union level of elections. However, except capital expenditure and sales tax none of the variables show significant PBC for the state level elections. Analyzing the union level election approximated at state level we find that, the right-wing normally have higher deficit in all components compared to center-left government whereas, the year of the election deficits are lower under the right-wing and higher under the center-left governments. The center-left-wing expenditures are generally higher than the right-wing government. Similarly, the year of election expenditure of the center-left-wing government is significantly higher in the case of aggregate and capital expenditure whereas, revenue and social sector expenditure is opportunistically higher in case of right-wing government. Using the state level election and state level information, we find that the left-wing normally have higher deficits as compared to the right-wing and the centrist parties. The election year deficits are higher in gross fiscal deficit and primary deficit under the right-wing and primary deficit and revenue deficit under the centrist incumbent. At the state

level, the left-wing parties generally spend lower as compared to the right-wing and the centrist governments. The centrist spend more in all the four expenditure components namely, aggregate, revenue, capital and social sector expenditure whereas, right-wing spend more in aggregate, revenue and capital expenditure. The revenue variables indicate that the left-wing government normally generates less revenue as compared to the right and the centrist parties. At the union level election, there is center-left-wing partisan and opportunist convergence in all the deficits heads. There is a strong center-left partisan and the opportunist government convergence in the aggregate expenditure and capital expenditure, whereas weak convergence of revenue expenditure in the case of the right-wing partisan and the opportunist government.³ Similarly, the center-left partisan behavior converge with the opportunist government in the case of revenue receipts, tax revenue and non-tax revenue. At the state level, convergence is not very strong. That is, there is no convergence in opportunistic and partisan behavior of any party in deficit variables, whereas, there is weak convergence in aggregate and revenue expenditure for the right-wing. Further, the right-wing opportunistic and partisan behavior converges in the case of revenue receipts and tax revenue. For the union as well as the state level, in most of the cases, higher density of population shows higher deficit, expenditure as well as the receipts whereas, the GDP and GSDP growth rate (their lags) respectively show the lower deficit, expenditure and revenue. Similarly, in most of the cases, if the center and state has the same ruling party then it shows lower deficit, expenditure and revenue, this is true also in the case of the coalition government at the union and the state level.

³It converges but coefficients are not significant whereas, strong convergence imply significant coefficients

1.5 The Center-State Political Transfer Cycles

1.5.1 Background

Chapter 5 can be seen as a further another extension of Chapter 3, which analyze center-state political transfer cycles. In a federal structure, the central government has the incentive, as also the capability, to manipulate the transfers given to the states (provinces/ sub national jurisdictions) so as to enhance the possibility of winning the national as well as the state elections. This idea is based on the concept of a PBC, which alleges that the incumbent can opportunistically manipulate the fiscal policy to increase the possibility of winning the election (see [Manjhi and Mehra, 2016](#)) for a theoretical exposition of this issue). Some recent works on PBC state that the opportunistic behavior help the incumbent to win the election in Colombian municipalities ([Drazen and Eslava, 2010](#)) and spending more opportunistically close to the election helps to win the election in the Portuguese municipalities ([Aidt, Veiga, and Veiga, 2011](#)) and [Chortareas, Logothetis, and Papandreou \(2016\)](#) also confirm for Greece's municipalities that the opportunistic expenditure by the incumbent is electorally rewarded.

Since, this is in consonance with the study of PBC, most of the research in this area have similar literature, analysis and implications. Therefore, historically the political transfer cycles (PTC) literature can draw upon the work on political business cycles and PBC. However, there does exist some literature which are specific to the centre-state transfers, such as [Kroth \(2012\)](#), [Reid \(1998\)](#), [Kneebone and McKenzie \(2001\)](#), [Alesina and Paradisi \(2014\)](#), [Baskaran, Brender, Blesse, and Reingewertz \(2016\)](#), [Sengupta \(2011, 2016\)](#) etc. [Kroth \(2012\)](#) finds that provinces where the national ruling party faces higher electoral competition receive higher per capita transfers in the year before the election, and this increase is driven by a conditional grant, which is the non-formula-based component of the total inter-governmental transfer. The evidence of local budget cycle can also be found in [Reid \(1998\)](#) and [Kneebone and McKenzie \(2001\)](#) for the Canadian provinces. [Alesina and Paradisi \(2014\)](#) find

a strong PBC, particularly for South of Italy using a ‘lower tax’ regime close to the election, whereas [Baskaran, Brender, Blesse, and Reingewertz \(2016\)](#) find that a low share of revenue raised by Israeli local municipalities budget creates excessive dependence on central government transfers, and hence the PBC. However, tightening of the monitoring eliminates it. [Sengupta \(2011\)](#) demonstrates that federal welfare may actually increase with the politically motivated transfers, and the state ruled by the same government as the center, receives higher grants and, hence, more public good. [Sengupta \(2016\)](#) finds that if the central government grant is tied up with a public project of the province, provincial tax and central transfers tend to be strategic substitutes: a higher central transfer lowers the marginal utility of public project to the province and the province responds by cutting down taxes.

1.5.2 Motivation

The motivation is because of the fact that, often, the central government announces the transfer schemes well prior to the election. Also, they might transfer resources from the center close to the election, particularly on the visible items. As in case of PBC, one can posit the center-state PTC and raise the question: can the national level incumbent government strategically transfer the resources to states? Also, whether by transferring the resources she/ he can increase the chances of winning the election and form the government?

This chapter analyzes the behavior of the incumbent government with respect to various transfers’ components of the union government to its provinces (states) in an electoral term and the year of elections. This very idea is in consonance with the concept of PBC, and known as the PTC. Three most important transfer components from the union to the provinces in India that are analyzed here are - grants from the center (Gfc), loan from the center (Lfc) and tax devolution (Td). There are three institutions also, which control the transfers from the center to states. Firstly, Finance Commission (FC) decides on the level of the Td and non plan grants and; since FC is an independent body, the direct political influence of FC is the least possible scenario

here. Secondly, Planning Commission currently known as National Institution for Transforming India (NITI) Aayog recommends grants and loans for implementing development schemes. Finally, grants provided by the different ministries to the specific projects fully funded by the center (central plan schemes) or the cost of the development schemes are shared by the states (centrally sponsored schemes). The grants for state plan schemes require center's approval of the projects proposed by states; hence, there is a possibility of some discretion (Rao and Singh, 2001). In general, the possibility of political influence cannot be ruled out in case of Gfc and Lfc , but this may not directly manipulate Td .

1.5.3 Method and Basic Results

Chapter 5 analyzes the union government's politically motivated transfer behavior toward its provinces with the aim to win the election. It is especially interesting to analyze the effect of transfers on election outcomes in a country where caste and religion based politics and political alignment are frequently used for political gains. This chapter empirically analyzes the center-state PTC. That is, using the Pesaran, Shin, and Smith (1999) method of pooled mean group (PMG) panel-data estimation methods for a balanced panel data from 1980-81 to 2010-11 for 14 Indian states, we try to find whether the election affects the individual components of transfers from the center to the states, namely, grants from the center, loan from the center, and tax devolution. We also attempt to examine if different transfer variables and other politico-economic characteristics of the country are able to create the possibility of retaining the political power for the incumbent.

The political transfer cycles are pronounced more in the year before the parliamentary and in the year of the assembly elections in the case of loan from the center whereas, transfer cycles in grants from the center are found only in the year before the assembly elections. The right-wing and the coalition government in general provides less transfers to the states in both, the year of the union and state elections except the higher grants from the center to the states in the year of the assembly

election. Having the same party in power at the union and state level or state ruling party being aligned to the union government is associated with higher grants and loans than the non-aligned ones.

The paper is also extended to a binary Logit specification to investigate the incumbent's probability of winning the election. There are not very strong results of politically motivated transfers that affect the victory of incumbent for both, parliamentary and assembly elections. However, the opportunistic manipulations of Gfc in the year before the parliamentary election, and Lfc in level can help the incumbent to regain its power in both the parliamentary and assembly elections. The economic variable, inflation is harmful for the incumbent as it increases the likelihood of losing the election both, at union and the state level elections. Similarly, a right-wing government is more likely to win the election, whereas, if the center and state have the same government or state government is an ally, the possibility of retaining power for the union government is less but it is higher in the case of the state level government. Further, a coalition government, in general, reduces the winning possibility in both, the parliamentary and the state elections.

The next section analyzes the strategic interaction between two political parties in the presence of special interest group and voters a subject of analyses of Chapter 6. The interest groups are a very important part of democracy where economic policies determine the political outcome and vice-versa.

1.6 A Dynamic Analysis of Special Interest Politics and Electoral Competition

1.6.1 Background

Chapter 6 analyzes the dynamics of special interest politics and electoral competition. In the context of economic modeling, interest groups have been playing very important role for a long time, as also depicted by political scientists such as Bentley

(1908), [Schattschneider \(1935\)](#), [Truman \(1951\)](#), and more recently by economists such as: [Olson \(1965\)](#), [Stigler \(1975\)](#), [Austen-Smith \(1987\)](#), [Borooah and Ploeg \(1983\)](#), [Becker \(1983, 1985\)](#), [Grossman and Helpman \(1994, 1995a, 1995b, 1996, 1999, 2001\)](#), [Goldberg and Maggi \(1999\)](#), and [Persson \(1998\)](#). The conceptual understanding of the quid pro quo kinds of relationship between political parties/ politicians and interest groups can be analyzed from three kinds of literature. Firstly, [Grossman and Helpman \(1994, 1995a, 1995b, 1996, 1999, 2001\)](#), [Goldberg and Maggi \(1999\)](#), and [Persson \(1998\)](#) are some of the major contributions which look at the relationship between the special interest group and political parties/ politicians. In these models the basic idea is that the interest groups provide financial contribution to the political parties or politicians and, in return, they want the economic policies to be positively biased towards them. However, voters might not like this, but this disliking can well be compensated by the ideological bias the citizen-voters have. [Persson \(1998\)](#) states that there is misallocation of public goods and the organized special interest group get a higher rent than what is social optimum, and the unorganized groups get less. The second strand of literature is related to either the competition between interest group or between the political parties/ politicians. [Borooah and Ploeg \(1983\)](#); [Coughlin, Mueller, and Murrell \(1990b\)](#) analyze the electoral competition model in the presence of special interest group and find that the strength of the interest group can be viewed as the politician's perception of a group's reliability in delivering the votes of its members. [Coughlin, Mueller, and Murrell \(1990a\)](#) show that, increase in the group influence does not cause government size to increase in general but does cause an increase when the government cannot change tax shares or provide untaxed consumption good. [Denzau and Munger \(1986\)](#) and [Mitchell and Munger \(1991\)](#) analyze the model involving legislatures, voters and interest groups, and find that the interest group will ingratiate with that legislature whose voters are indifferent to the policy that interest group seeks. The third strand of literature comprises the empirical works of various types. The third strand of literature are empirical in nature. For instance, [Bouton, Conconi, Pino, and Zanardi \(2013\)](#) in the context of gun control in US find that close to the election, senators are more likely to vote for a pro-gun

policy, and this would be both in the presence and absence of financial contribution to the senators gun lobbies. In this connection [Goss \(2010\)](#) state that the gun lobbies in US are intense, well organized and are willing to vote for and against the candidates purely on the basis of their position on gun control. Similarly, [Fiorino and Ricciuti \(2009\)](#) find that government spending is sensitive to the preferences of heavy industry rather than those of textile and cereal cultivators during 1876 to 1913 Italy.

1.6.2 Motivation

The evolution of democracy, and thereafter, the presence of interest group in it provides a strong basis for quid pro quo kind of relationship between politics, economics and special interest group. It can be traced well back to the Roman history as the rise of Julius Caesar, where he was financially supported by Marcus Licinius Crassus (Crassus) and Gnaeus Pompey Magnus (Pompey) in 60 BC to 53 BC. Consequently, Caesar was able to secure the power as a consul of Gaul. The trio - Julius Caesar, Crassus and Pompey – formed a group famously known as ‘the triumvirate’ and they ruled the Roman Empire for many years ([Emmert, Alexander and Gardner, Char and Gardner, Robert H \(Producer\[s\]\), Gardner, Robert H \(Director\[s\]\), 2008](#)). The motivation is also due to some recent observation about the quid pro quo kind of relationship between politics and SIG. For example, in an empirical paper by [Huber and Kirchler \(2013\)](#), the companies who experience abnormal positive post-election returns are those who operated a higher percentage of contributions to the eventual winner in US presidential elections from 1992 to 2004. Similarly, in Indian context, [Kapur and Vaishnav \(2013\)](#) show that, politicians and builders engage in a quid pro quo, whereby the former place their illegal assets with the latter, and the latter rely on the former for a favorable delivery of the wealth during the election.

1.6.3 Method and Basic Results

Chapter 6 develops a model of dynamic games between two political parties/ politicians in the presence of citizen voters and a special interest group (SIG). The political parties offer expenditure for the provision of public goods, voters observe it and vote retrospectively. The electoral contestants also offer regulatory benefit to the industrial interest group in exchange of financial contribution to meet the large expenses of the election advertisements and campaign. Again, the method of optimal control has been used to find out the optimal solution for the political contestants in the open and closed-loop framework.

The basic results state that the closed-loop solution collapses to an open-loop one. That is, commitment to its own plan of action by the parties, given the initial state and time, results in the same outcome even if the political parties change their strategy based on the state at every point in time. The offer of the expenditure on public good is higher if per unit voting support is higher and the offer of higher expenditure also requires correspondingly larger lump-sum tax and higher withdrawal of voters relative to the discount factor (at which the accumulation of net voting support and financial contribution received build up). If the per unit voting support and financial contribution to first party is higher than the second one and the voting support and financial contribution withdrawal is higher than the discount factor at which the accumulation of the net benefit of voting support and net financial contribution build up, political parties will offer a positive and higher expenditure on public good and render a positive regulatory benefit in order to seek a larger share of voting support and financial contribution. The lower per unit cost of the offer of expenditure on public good and regulatory benefit enhance the offer of higher expenditure and regulatory benefit to receive larger voting share and financial contribution. The higher financial contribution of bribe also provides higher regulatory benefit to the SIG and larger voting share to the political party. The voting support and financial contribution received by first party will always be higher than second one if the per unit voting support and per unit financial contribution of bribe is higher for first

party than the second one. The outcomes at the private optimum are always higher than those at the social optimum in terms of the offer of expenditure on public goods and regulatory benefit by the political parties, voting support by citizen voters and financial contributions by the SIG. At the private optimum, the offer of expenditure on the public good tends toward overspending by the political party in response to the voting support that it receives from the voters. A corollary to this result is that, higher the voting support, higher is the offer of expenditure on public good by any political party. In comparison, again at the private optimum, the promise of regulatory benefit is more favorable, higher are the voting support from citizen voters and financial contributions from the SIG. The optimal solutions at the private and social optimum constitute a steady state saddle point equilibria.

1.7 Conclusion

This chapter introduces the preamble of the thesis in terms of background and origin of the interdependency between economics, politics and interest group. The scope of the research pinpoints the possible area of gap at which this thesis build up. It further unfolds the chapter-wise basic background, motivation, method of the research and brief analysis of the results.

This chapter also briefs about the proceeding of all the technical chapters. The first technical contribution (Chapter 3) analyzes the dynamics of political budget cycle under the opportunistic and partisan behavior of the incumbent. The theoretical model derives results with the clear parametric demarcation of opportunism and partisan behavior of the government. Chapter 4 and 5 are the empirical works in the context of India and is closely related with Chapter 3. Chapter 4 explains about the strategic behavior of the incumbent government when they are of different partisan type's namely-left, right and centrist or opportunist type. Chapter 5 seek to find whether the transfer component from the union to its provinces has a possibility of political manipulation and whether that manipulation can help the incumbent to

win the election. Chapter 6 analyze a dynamics of the economics of special interest politics and electoral competition under open and closed-loop framework.

The introductory chapter is followed by literature review in Chapter 2, the dynamics of political budget cycles have been analyzed in Chapter 3. Chapter 4 empirically analyze whether the partisan and opportunistic cycles converge in the different point of time in the electoral terms. Chapter 5 investigates whether there are political motivation of the transfers from the center to the states in terms of grants, loans and tax devolution and in turn whether these transfers help the incumbent to win the elections. Chapter 6 explains about a dynamic analysis of special interest politics and electoral competition in the framework of open and closed-loop. Chapter 7 concludes the thesis and ends with possible future research questions.

CHAPTER 2

Review of Literature

2.1 Introduction

The four broad topics that this thesis analyzes are: dynamics of political budget cycles, analysis of special interest politics and electoral competition, examining whether opportunist and partisan cycles converge - empirical evidence from India and center-state political transfer cycles, again for the Indian federation individual chapters analyze these issues in detail. Each of these chapters are interlinked and, hence, sequenced accordingly from Chapter 3 through Chapter 6. In these chapters, we review the existing literature that revolves around each of these issues, and also try to motivate in the light of real world observation and historical facts and present the contributions of the thesis to the existing literature. Chapter 2 divides the section in the following manner. The literature pertaining to political budget cycles of Chapter 3 has been analyzed in Section 2.2. Section 2.3 analyzes the literature pertaining to the partisan and opportunist cycles and their convergence (Chapter 4). Section 2.4 discusses the literature relating to the center-state political transfer cycles (Chapter 5). Section 2.5 examines the existing literature pertaining to a dynamic analysis of special interest politics and electoral competition (Chapter 6).

2.2 Political Budget Cycles (PBCs)

In this section, the existing literature on PBCs has been discussed chronologically. The literature can be broadly divided into the first generation and second generation models in the realm of both opportunistic and partisan frameworks.

2.2.1 First Generation Opportunistic and Partisan Models

The first generation models came about in the mid-1970s, led by the opportunistic models of Nordhaus (1975) and Lindbeck (1976), and the partisan model by Hibbs (1977). Nordhaus (1975) and Lindbeck (1976) use the traditional macro-models, where the incumbent deliberately creates an advantageous situation for herself/ himself to get re-elected in the upcoming election by using an exploitable Phillips curve. In this case, voters are assumed to be naive, do not remember the past, behave irrationally and, do not have the knowledge about the trade-off between unemployment and inflation. The central bank is controlled by the president or the prime minister of the country. The analysis shows that the incumbent willingly boosts the economic activities immediately before the election by having higher inflation along the Phillips curve. However, the resultant inflation is balanced out in the post-election period by recessionary economic activities created by the government. Interestingly, since the economy does better immediately before the election, because of the opportunistic nature of the incumbent, the incumbent gets rewarded by higher votes. Thus, voters can be fooled by the government time-after-time because of their irrational character. These models are named as ‘opportunistic’, since politicians do not have any policy preferences of their own; rather, they focus only on winning the election.

The first generation models consist of three basic equations in both opportunistic and partisan frameworks. The first is the equation of economic activity, shown by the Phillips curve, which explains the relationship between overall economic activity and inflation. It states that, when actual inflation exceeds the anticipated inflation, it results in enhanced economic activity. The second equation is the loss function of

voters. In different models, the loss function has been deployed differently, but the basic loss function is a quadratic function, where output and inflation are being used as deviations from their respective targets. The certain weight has been assigned to fluctuations in output relative to fluctuations in inflation from their respective target levels of potential output and inflation in the voter's loss function (dissatisfaction) by the electorate. So, in the basic Nordhaus's (Nordhaus, 1975) model, the loss function depicts the loss that voters assign to economic cycles. Normally, the voting behavior is retrospective in nature. So, voters observe the loss in the previous period and then decide whether to vote for the incumbent or not. Hence, there is the possibility for the incumbent to manipulate economic activities.

Contrasting with Nordhaus (1975), the concept of 'partisan' model was propounded by Hibbs (1977), which investigates the post-war behavior of macroeconomic policies, and the results associated with the left and right-wing governments in capitalist democracies. In fact, this view states that the left-wing parties are relatively more concerned with unemployment than with inflation, while the right-wing parties have opposite concerns. Though both the parties desire to be in the office, the prime objective of the partisan government is its desire to be in the office for her/ his preferred policies to be implemented. In the standard Hibbs (1977) model, parties $j = 1, 2$, are having different targets of output and inflation and assign different relative weights to the fluctuations in output versus the fluctuations in inflation in the loss function. Contrary to the opportunistic model, the partisan model by Hibbs (1977), and the rational partisan model by Alesina (1987), use the loss function as the preference of the partisan incumbent and opponent. Therefore, both the parties differ in the weight they assign to the fluctuations in output and inflation from their respective targets. The formation of adaptive expectations is the third equation in both the opportunistic model by Nordhaus (1975) and partisan model by Hibbs (1977). The possible differences between the left and right-wing parties may entail that the left-wing party has a higher target level of the economic activity than the right-wing party, the left-wing party may have a higher inflation target than the right-wing party, irrespective of change in economic activities through Phillips curve, and the left-wing party may

assign a larger cost to the deviation of economic activity from its target than the right-wing party.

The basic Nordhaus's (Nordhaus, 1975) model has invited strong criticisms. The irrationality of voters is a rather naive assumption in Nordhaus (1975) model. That is, if the voters have lived through the cycles of economic activities during the tenure of the incumbent, then voters can punish the incumbent rather than rewarding her/ him. In both Nordhaus (1975) and Hibbs (1977) monetary models it is assumed that the president, the prime minister or the country's executive control the monetary policy and, in fact, this assumption is contrary to the concept of central bank independence. The third important criticism of the model is that monetary policy plays a bigger role as compared to fiscal policy. However, the preceding enhanced economic activities from the time of election can also be affected by fiscal transfers. Hence, one cannot ignore the role of budget cycles in the pre-election policy manipulations. The basic criticisms of Hibbs (1977) are similar to that of Nordhaus (1975), such as irrationality of voters, central bank being controlled by the prime minister or the president of the country and so on. This led to the emergence of second generation models.

2.2.2 Second Generation Opportunistic and Partisan Models

The second generation models emerged in the mid-80s. Seminal papers by Cukierman and Meltzer (1986), Rogoff and Sibert (1988), Rogoff (1990), and Persson and Tabellini (1990) deal with an opportunistic model in a rational expectations framework. Also, in the 1980s and 1990s, a new game theoretic approach evolved to understand the macroeconomic behavior. These models utilize the concept of rational expectations that restrict the magnitude of the opportunism of exploiting the Phillips curve.

In the opportunistic model with rational expectations, voters understand the trade-off between unemployment and inflation, and they might punish the incumbent. In this case, the incumbent cannot fool the voters time-after-time. Persson and Tabellini

(1990) added the concept of competency in the Nordhaus (1975) version of the Phillips curve. These authors focus on the competency of the candidate along with asymmetry of information on the observation of inflation and output. For example, they state that, “one candidate may be particularly able (or unable) to cope with a shock in the price of oil, or the effective labor market legislation, or to negotiate with trade unions” (Persson and Tabellini, 1990, pp. 80). The political parties behave opportunistically to show their competency in the election. The existence of a PBC with one type of policymaker and voters voting retrospectively are the two important results. In this model, a competent policy maker expands economic activity immediately before the election and voters observe this to re-elect the policymaker. However, only one type of policymaker creates the pre-electoral expansion while the other creates a downturn. The model is silent about the post electoral recession. Another important result of the model is the concept of retrospective voting, that is, voters re-elect the party which creates a pre-electoral boom in the economy. Rogoff and Sibert (1988) and Cukierman and Meltzer (1986) together propose the model of competency with government budget and not the Phillips curve. The government expenditure is financed by lump-sum taxes and seigniorage revenue. The competency term is the additional factor in the government’s budget constraint. Rogoff and Sibert (1988) derive that each type of policymaker, with the exception of the least competent, distorts the pre-electoral fiscal policies. That is, in the pre-electoral period, the possibility of lower taxation and higher deficit or higher inflation (resulting from seigniorage) can exist. Rogoff (1990) sets up a model similar to Rogoff and Sibert (1988), where government expenditure and public investment have been depicted as a function of lump-sum taxes and competency. Under asymmetry of information on the nature of the policymaker, there exists a separating equilibrium, where a competent incumbent signals her/ his executive abilities by reducing public investment below the full information efficient level, and conversely, increases government expenditure above the efficient level. Hence, the competent policymaker programmes the PBC, which induces the government to spend more on visible public goods, together by reducing taxes. Cukierman and Meltzer (1986) propose another competency-based

model consistent with pre-electoral policy distortion. Even in this model, authors explain that, due to asymmetry of information between the government and voters, incumbent has an incentive to distort fiscal policy in the electoral term.

The opportunistic PBC from the first - to the second - generation differed in terms of moving from the assumption of adaptive expectations to rational expectations. The rational opportunistic model reduces the shortcomings of the models with adaptive expectation. However, with a similar approach, the first generation model provides a better scope to exploit the Phillips curve under irrational citizen voters. The major implications are similar, but they differ in their growth predictions. In the adaptive expectations model, monetary and fiscal policy are more effective in creating the desired macroeconomic cycles as compared to the rational expectations framework, which is mainly a consequence of irrationality of voters . So, the electoral effect lasts for a longer duration in the traditional models than the rational version. In traditional (adaptive expectations) model, every government is identical in behavior, whereas in the rational version, incumbents often behave less opportunistically and might follow the optimal policy rule for the economy.

In the partisan model, rational expectation and price rigidities have been introduced by [Alesina \(1987\)](#) after a large criticism of the exploitable Phillips curve based monetary model of political business cycle. A similar three-equation model has been used in this rational-partisan framework. This model keeps intact the expectations augmented Phillips curve but changes the remaining two. He divides the tenure into two periods and election takes place in every other period such as $t, t + 2, t + 4...$ etc. [Alesina \(1987\)](#) incorporated forward output and lag inflation as the deviation from the partisan output and inflation target respectively in the already existing equation of loss function by [Hibbs \(1977\)](#). Further, the adaptive expectations are replaced by rational expectations. The incumbent chooses the optimal policy by maximizing the loss function subject to the Phillips curve equation. Alesina's rational partisan model concludes that unemployment is lower and inflation higher under the left-wing government than the right-wing party in the first half of the term. Since, expectations

are formed before the election in the first term, so, after the election, left-wing wins imply higher inflation than anticipated and right-wing victory means inflation is lower than expected. Moreover, there cannot be any economic fluctuation in the second term as contracts are signed, knowing who has won the election. In contrast, [Hibbs \(1977\)](#) states that overall economic activity is higher in the left-wing government than the right-wing government in her/ his administrative span.

[Alesina \(1987\)](#) also faces a number of criticisms. The first equation of the Phillips curve talks about the implicit contract of the workers in the first term under uncertainty of election outcome. [Garfinkel and Glazer \(1994\)](#) suggest that the problem of uncertainty can be resolved by simply postponing the contract by workers till the election outcome. Thus, there is a clear tendency towards delaying the contract until after the election outcome.

Interestingly, there exists some literature that looks at the possibility of merging of both opportunistic and partisan versions of the model. [Alesina and Rosenthal \(1995\)](#) have made some effort in this direction to merge the concept of competency with partisan behavior of government. [Frey and Schneider \(1978a\)](#) suggest that a partisan politician becomes opportunistic in the office, particularly when she/ he is relatively less popular. Thus, the possibility of partisan politician to play a mixed role - being an opportunistic when in the office, and being partisan when outside the office cannot be ignored (see Chapter 4 for detail analysis).

Following several criticisms of the opportunistic and partisan models, [Drazen \(2000\)](#) proposes a new model of PBC, based on [Rogoff \(1990\)](#). [Drazen \(2000\)](#) extends this model by including both monetary and fiscal policy with opportunistic and forward looking citizen voters to capture the PBC, popularly known as ‘Active-Fiscal Passive-Monetary (AFPM)’. That is, the incumbent government can directly influence the fiscal policy, but monetary policy is controlled by the monetary authority, such as in case of an independent central bank. However, monetary authority can be exploited to accommodate fiscal decisions of the incumbent. [Drazen \(2000\)](#) also presents the non-parametric empirical evidence in favor of AFPM.

More recently [Aidt, Veiga, and Veiga \(2011\)](#) find that the opportunistic behavior of the incumbent leads to larger winning margins, and the incumbent behaves more opportunistically when the previous election win margin is small. Their model explains that competent politicians manipulate fiscal decisions before the election to show their competency and increase their probability of getting re-elected. [Brender and Drazen \(2005\)](#) state that the PBC is more pronounced in a ‘new’ democracy than an ‘old’ one with stronger magnitude of cycles in the former. Empirical evidence also states that budget cycles are pronounced in less-developed countries than the more developed ones and among the countries that have lower level of democracy. In contrast, [Alt and Lassen \(2006\)](#) find that the fiscal balance cycle depends on the degree of fiscal transparency. Among the 19 advanced OECD industrial countries, authors find that electoral cycles exist in lower transparency countries, whereas no such cycle is evident in higher fiscal transparency countries. Also, electoral cycles are larger in magnitude in politically more polarized (distance/ absolute difference between parties’ platforms) countries. However, [Brender and Drazen \(2008\)](#) suggest that an increase in the government budget deficit during the election year is punished by the voters, and this result holds irrespective of election happening on pre-scheduled or the early-called. [Vergne \(2009\)](#) states that the election year public spending shifts towards more visible goods, such as wages and subsidies, and away from capital expenditure. However, even though countries gain experience in electoral politics, the electoral impacts of fiscal allocation are carried on. Moreover, the evidence also supports the view that when elections are called during favorable economic conditions, as well as pre-electoral manipulations help politicians in winning elections ([Frey and Schneider, 1978a,b](#); [Alesina, Cohen, and Roubini, 1993](#); [Akhmedov and Zhuravskaya, 2004](#); [Drazen and Eslava, 2010](#)).

Notice that, there is hardly any literature available that models the fiscal deficit directly in the objective function of the incumbent. This is one of the clear lacunae in the literature. Our research, in Chapter 3, aims to fill this gap. We model the optimal budget deficit and voting support in a dynamic optimal control framework. Our paper aims to extend the models of opportunistic and partisan politics by incorporating

the time-dynamics of voting support and budgetary deficit, just prior to and post the election period, orchestrated through changes in fiscal policy. In a complete information framework, we look at the time path of both opportunistic and partisan governments using budgetary deficit as the policy instrument. Both opportunistic and partisan behavior of the incumbent creates PBCs and rewarded by voting support. However, the former is more costly to the economy. In the case of a strong anti-incumbency, an opportunistic incumbent is highly rejected by the citizen voters.

2.3 Opportunist and Partisan Cycles and their Convergence

Chapter 4 is the empirical extension of Chapter 3. Since both cover similar issues, although using a different method, the literature covered in the context of Chapter 3 is relevant here as well. However, there are some studies that analyze the possibility of convergence of partisan and opportunistic behavior of the political parties. As discussed, the initial and seminal contribution in the area of political business cycles is by Nordhaus (1975). The earliest literature on political business cycle is based on opportunistic manipulation of the economic variables that utilizes an exploitable Phillips Curve, where an incumbent attempts to create lower unemployment and higher output close to the election, thus increasing the chances of win. This very concept of opportunistic model of political business cycle was further popularized as PBC by Rogoff and Sibert (1988), Rogoff (1990), Persson and Tabellini (1990, 2003), Drazen (2000), Shi and Svensson (2002b), Brender and Drazen (2005), Aidt, Veiga, and Veiga (2011) etc.

The partisan motivation of an incumbent is based on the specificity of the economic issues based ideology of the incumbent. For example, the left and the right-wing incumbents have different policy positions and, hence, have diverse macroeconomic goals. The partisan political business cycle models have been propounded by Hibbs (1977), Alesina (1987, 1988), Faust and Irons (1999) etc.

Even though these two concepts are clearly defined, there is a possible intersection

between the two, for example - partisan can implement partisaneering policies close to the election, and it remains ambiguous as to whether this was the partisan behavior or an opportunist one. Consequently, we seek an answer to the question: whether the partisan cycles and opportunist cycles occur together. For example, the American political system is ‘polarized’ into two parties – Democrats and Republicans - and they have different economic policy stands. Empirically, the former is concerned more about unemployment, whereas the latter worries about inflation ([Alesina and Rosenthal, 1995](#)). If these preferred policies are more visible close to the election, then, the possibility of convergence is inevitable. The different policy stands of the political parties in terms of unemployment and inflation create political cycles given the concept of an exploitable Phillips curve holds. Similarly, [Hibbs \(1977\)](#) finds that the right-wing parties are more concerned about inflation whereas left-wing parties worry about unemployment. The polarized policy stand of the two parties can be the ideal position to be held by parties, but indifferent (less polarized) policy stand by the two parties are quite possible for electoral competition. Rather, just prior to the election the stiff political competition can lead to an identical (or near identical) political positions ([Alesina and Rosenthal, 2000](#)). In such scenarios as well, the partisan and opportunistic behavior can possibly converge. [Manjhi and Mehra \(2016\)](#) conclude that opportunistic and partisan cycles follow a similar time pattern, where the cycle is more pronounced in the former case as compared to the latter just prior to the election. In addition, an opportunistic cycle is more costly for the economy in the aggregate than a partisan one, even though it helps better in winning the election than otherwise.

The important questions posed in this regard are as follows. Is there a clear line drawn between the two types, such that one type always behaves opportunistically while the other behaves as partisan? Or, is it the case that a partisan politician also behaves as an opportunist close to the election? Whether the opportunist will behave like a partisan if the country has a domination of partisan type parties or the other way around (not modeled explicitly)? Whether the party will behave like an opportunist when she/ he is in office and partisan otherwise? [Frey and Schneider \(1978a\)](#) find

that this is true. That is, a party behaves opportunistically when in office, and in a partisan framework when outside of office.

Chapter 4 of the thesis explores the behavior of the incumbent government in terms of how they use different fiscal policy instruments. Is it that the incumbent has uniform and stable behavior during the electoral term? That is, whether the economic policy stance of the political parties in an electoral term in general and election years versus non-election years, in particular, are different or not? The specific questions for which answers are sought for are: whether the incumbent's economic behavior with respect to fiscal deficits, expenditure and revenue variables are consistent throughout the electoral term or do they change with different time of the electoral term? Some attempt already been made to analyze the partisan and opportunistic cycles and whether these cycles occur together. In fact Klein (2014) confirms the close association between opportunistic and partisan cycles in Brazil close to the municipal election between 2001 to 2008.

In the case of parliamentary elections in India, the basic findings of the paper indicate that ideological differences and its reflections in the economic policy are more visible at the national level elections and not at the assembly level. Similarly, the opportunistic behavior of the parties is also more visible in the parliamentary election and not at the assembly elections. Analyzing the union level election approximated at state level we find that there is center-left-wing partisan and opportunist convergence in all the deficits heads. There is strong center-left partisan and the opportunist government convergence in the aggregate expenditure and capital expenditure, whereas weak convergence (coefficients are as expected but not significant) of revenue expenditure in the case of the right-wing partisan and the opportunist government. Similarly, the center-left partisan behavior converge with the opportunist government in the case of revenue receipts, tax revenue and non-tax revenue. At the state level, convergence is not very strong. That is, there is no convergence in opportunistic and partisan behavior of any party in deficits, whereas there is weak convergence in aggregate and revenue expenditure for the right-wing. Further, the right-wing opportunistic and

partisan behavior converges in the case of revenue receipts and tax revenue.

2.4 The Center-State Political Transfer Cycles

Chapter 5 is yet another extension of the PBC concept of Chapter 3, but differs in certain significant ways. The nature of cycles that are examined are those that pertain to the center to state transfers in a federation under various heads: grants from the center (Gfc), loans from the center (Lfc) and tax devolution (Td). Chapter 5 traces the political transfer cycles (PTC) from the union of India to the states. This concept has similar implications as PBC, because both attempt to observe the pre-electoral manipulations of key fiscal variables.

The three institutions involved in the transfer of the resources are: the Finance Commission (FC), the Planning Commission (Now NITI Aayog) and the central government ministries. The Td is mostly under the purview of FC, and it is an independent body under the Constitution of India. However, there is already a greater role to be played by the Planning Commission and central ministries for transfers such as: Gfc and Lfc . Overall, it appears that the central government tries to maintain political control over the transfers in some way. Also, there is evidence of attempts to influence on the antecedent and consequences of the whole transfer process. Rao and Singh (2007) and Rudolph and Rudolph (2001) state that, even while the FC uses different formulae based decision on transfers or grants, it has been observed that the states which are represented as the member of the Commission do relatively better in terms of the received awards.

Since the notion of PTC has resemblance with the idea of PBC, it is pertinent to analyze some related literature, particularly with respect to India. Most of the PBC work in India has concentrated on voting patterns, electoral competition and fiscal manipulations. An almost non-existent research gap on PBCs in the beginning of 1990s for developing countries was filled in by Karnik (1990) in the context of India. Though, he is unsure about the existence of political business cycles in India, he finds

strong political economy interactions in the economy and evidence in favor of incumbent's economic policy manipulation with respect to the timing of elections. [Sen and Vaidya \(1996\)](#) examine whether there is electoral cycle in macroeconomic policy variables during 1951-1989, and find some evidence of pre-electoral manipulations in the price of the manufactured products, but not in output and aggregate price behavior. These authors also state that there is no clear evidence of increasing inflation during the election; however, there has been a strong evidence of pre-electoral monetization of the government budgetary deficit. [Lalvani \(1999\)](#) states that the re-allocation of available resources is targeted on those expenditure categories that help them to collect maximum votes. [Chaudhuri and Dasgupta \(2005\)](#) find that economic policies are being affected by election timing, irrespective of the type of government (single party majority or coalition). However, [Chaudhuri and Dasgupta \(2006\)](#) considered 14 Indian states and find that states manipulate their fiscal policies. That is, the government raises less commodity taxes, incurs less expenditure on current account and has higher developmental capital expenditure during the election years, a result that is more prominent in the case of coalition government than a single majority government. [Khemani \(2004\)](#) finds that government manipulates policies during the election periods by targeting the expenditure towards special interest groups in exchange for campaign support, provision of tax breaks to small producer groups, spending shift to investment projects (surprisingly, not on the populist categories) and so on. In short, the state governments spend more in public investment before the scheduled elections and reduce the current spending, leaving the overall balance unchanged. [Lalvani \(2008\)](#) states that government spends more on 'desirable' and 'meritorious' products, such as primary education and agriculture, and not on subsidies. For example, even after under-utilization of resources on Sarva Shiksha Abhiyan (SSA, Education for All) and Mid Day Meal (MDM), government of India allocates large amount to these programmes.

In fact, there exists a large body of literature covering the political aspect of the transfers in India, namely [Rao \(1998\)](#), [Rao and Singh \(1999\)](#), [Singh \(2004\)](#), [Biswas and Marjit \(2002\)](#); [Biswas, Marjit, and Marimoutou \(2010\)](#), [Dasgupta, Dhillon, and](#)

Dutta (2004), Arulampalam, Dasgupta, Dhillon, and Dutta (2009), and Rao and Singh (2007). Rao (1998), Rao and Singh (1999), and Singh (2004) demonstrate that implicit transfers in India disproportionately benefit the richer states whereas Biswas and Marjit (2002); Biswas, Marjit, and Marimoutou (2010) show that states' representation in the cabinet of the central government affects the state wise distribution of letters of intent and industrial licenses in the former, and the non-formulaic 'discretionary' central fiscal disbursements in the latter, in a positive way. Dasgupta, Dhillon, and Dutta (2004) and Arulampalam, Dasgupta, Dhillon, and Dutta (2009) construct a redistributive model of politics where the central government is an opportunist and uses its discretion to disproportionately grant the aligned states, whereas Rao and Singh (2007) analyze the institutional process through which reform takes place and the influence of the politics on institutions such as the FC. The structure of federalism might be different across countries of the world. There are studies that cover the political influence, for instance, Inman and Rubinfeld (1994), Inman and Rubinfeld (1996), Dixit and Londregan (1995, 1996, 1998a, 1998b), and Lindbeck and Weibull (1987). Inman and Rubinfeld (1994) and Inman and Rubinfeld (1996) show how representation and assignment affect the political values of participation, protection of individual rights, development of civic virtues, allocation of goods and services and, hence, economic efficiency. Dixit and Londregan (1995, 1996, 1998a, 1998b) and Lindbeck and Weibull (1987) construct a theoretical model of tactical redistribution, which describes how a political party will design its policy platform in order to target the electoral goals. The former study aims to maximize the vote share and the latter targets on winning the election.

Even today, a majority of economics literature on PBCs concentrates on developed and industrial countries. In fact, political economic cycles and the study of the behavior of the government in developing countries are a more recent phenomenon. India displayed tremendous effort to usher in economic reforms for higher economic growth in the 1990s, which is also the period when coalition governments came into existence more prominently. Though, the caste and religious based divided democracy of India is one of the most important obstacles for an economic policy based opportunist in-

cumbent, recent trends of the voting pattern and victory of the parties who have won the election, based on economic performance show the possibility of a fiscal policy distortion. Hence, we cannot rule out the importance of economic performance for voting pattern. The studies on PBCs in India are largely based on the behavior of the expenditure, revenue and deficits in the election and the non election years. The studies pertaining to expenditure are: [Chaudhuri and Dasgupta \(2006\)](#) find lower current account and higher capital expenditure in the year of state elections in India, expenditure targeted to small interest group in the year of election [Khemani \(2004\)](#), [Lalvani \(1999\)](#) state that the expenditure shifts to those items which attract larger votes and [Lalvani \(2008\)](#) finds that the state government spends higher on ‘desirable’ and ‘meritorious’ products such as primary education and agriculture and not on subsidies. Similarly, the studies related to revenue are: ([B. B. Dash and Raja, 2014](#)) finds lower tax collection in the year before the election whereas [Chaudhuri and Dasgupta \(2006\)](#) finds lower commodity taxes in the year of election in India. However, there are hardly any literatures which directly focus on the strategic expansionary transfer of resource from the center to the states in the year of the elections. There is also dearth of analysis of PBC/ PTC on single party as well as the coalition government in developing countries, which is an obvious lacuna in the case of India. Further, in our case, apart from looking at the center-state PTC, we analyze their impact on the election outcomes as well.

In terms of the specific contributions Chapter 5 of the thesis analyzes opportunistic transfer from the center to the states, such as, Gfc , Lfc and Td . Once, the PTC are traced in terms of grants from the center and loan from the center, we further explore whether these opportunistic cycles help the incumbent to win the elections. The basic results state that - PTC in Lfc can be traced in the year before the election for the parliamentary elections but these occur in the year of the election for the assembly elections, whereas, Gfc cycles are found in the year before the assembly elections only. No clear cycles have been traced in the case of Td . This finding is similar to the literature on PBC such as [Aidt, Veiga, and Veiga \(2011\)](#), [Drazen and Eslava \(2010\)](#), [Klomp and De Haan \(2013b\)](#), [Chortareas, Logothetis, and Papandreou](#)

(2016) etc. A right-wing and coalition incumbent has the tendency to transfer less to the states, however, the former provides more grants to the states in the year of assembly elections. Additionally, if there exists the same party rule at the state level, or if the state is an ally of the center, the allied state receives more rewards from the center in the form of Gfc and Lfc .

Next, we analyze whether such politically motivated transfers actually impact the probability of winning the election. Using the Logit estimation method, we find that there are not very strong results of politically motivated transfers that affect the victory of incumbent for both, parliamentary and assembly elections. However, the opportunistic manipulations of Gfc in the year before the parliamentary election can help the incumbent to regain its power. Also, Lfc in levels generally help winning both, the parliamentary and assembly elections. The remaining economic, political variables and political dummies are robust in terms of the key results. For instance, inflation is harmful for the incumbent as it increases the likelihood of losing the election. However, a higher voters' turnout is more likely to help in winning the election for the incumbent, and a more experienced government has a higher probability of winning the election. Similarly, a right-wing government is more likely to win the election, whereas the presence of a coalition government in general reduces the winning possibility in both, the parliamentary and the state elections.

2.5 Analysis of Special Interest Politics and Electoral Competition

Chapter 6 analyzes the relationship between political parties/ politicians, voters and special interest groups in the context of elections. That is, we model the strategic interaction of the two political parties i, j in the presence of voters and special interest group in the dynamic game framework where political parties offer the expenditure on public good and regulatory benefit respectively to the citizen voters and the special interest group in exchange of voting support and financial contributions.

The literature in this section can be divided into three parts – theoretical work on the interaction of political parties/ politician with interest group in the presence of electoral competition. Secondly, the conceptual work pertaining to the competition between political parties or interest groups, and thirdly, the empirical research to find support for such interactions and impact on policy outcomes.

Some of the works of the first types include - [Grossman and Helpman \(1994, 1995a, 1995b, 1996, 1999, 2001\)](#), [Persson \(1998\)](#), which broadly look at the relationship between the special interest group and political parties/ politicians. In these models, the basic idea is that the interest groups provide financial contribution to the political parties or politicians and, in return, would like the economic policies to be positively biased toward them. But usually, voters do not like this quid pro quo type of relationship, which often ignores the voter's demand; this dislike may well be substituted by an ideological bias that citizen voters have. [Persson \(1998\)](#) constructs the political economy model that involves voters and special interest group. He states that, in the absence of the special interest group or the associated contribution from these groups, the government will be benevolent. However, often there is misallocation of public goods and the organized special interest groups get more than the social optimum and the unorganized groups get less.

The research by [Denzau and Munger \(1986\)](#), [Mitchell and Munger \(1991\)](#), [Anderson and Tollison \(1988\)](#), [Snyder and Ting \(2008\)](#), [Wittman \(2007\)](#), [Potters and Van Winden \(1992\)](#), [Potters, Sloof, and Van Winden \(1997\)](#), [Lohmann \(1995, 1998\)](#), [Wright \(1990\)](#), and [Austen-Smith and Wright \(1992\)](#) constitute other major works on this subject. [Denzau and Munger \(1986\)](#) and [Mitchell and Munger \(1991\)](#) analyze a model involving legislators, voters and interest groups. The supply price of the legislator's policy depends on the productivity of his effort, as determined by committee assignments, priority and ability, and by the preference of the unorganized constituency in the legislator's home district. The interest group will grovel to the legislator whose voters are indifferent towards the policy that the interest group seeks. If voters have a preference over the policy in effect, then, the interest group has to

pay a higher price to stay relevant, in a shared interest of polity with the legislator. In another extreme, [Anderson and Tollison \(1988\)](#) argue that if trading of votes is allowed across markets, voters will purely act as an agent of the interest group, who will bid competitively for the price of the vote. Since, an individual represents one vote, it tends to increase the transaction cost by bargaining on a one-to-one basis than otherwise if someone bridges between the sellers and buyers of the votes. The democratic outcomes become fully equivalent to interest group equilibria in the political market. [Snyder and Ting \(2008\)](#) develop a model to explain how strategic voters vote when they know that the interest groups are trying to skew policies in ways that voters do not like. They find that voters will re-elect if the chosen policy is sufficiently close to her/ his ideal point. Also the voter may allow the policy to deviate somewhat from her/ his ideal point to prevent excessive vote buying by the interest groups. [Wittman \(2007\)](#) analyzes that, in the presence of uninformed voters if the interest group endorses for the good quality leaders to come in power, it is welfare improving even though the group enjoys the benefit of private information about the quality of leaders. [Potters and Van Winden \(1992\)](#) and [Potters, Sloof, and Van Winden \(1997\)](#) both explain the model of financial contribution and lobbying for information on policies. The second paper extends the campaign contribution model of politicians to contributions by the interest groups. It appears that, for campaigning to be more revealing, it is sometimes crucial that campaign funds are supplied by informed interest groups. The interest groups contribute to the candidate's campaign, rather than direct endorsements. [Lohmann \(1995\)](#) analyzes that if the objectives of the interest group are aligned with that of the policymaker's constituency, they have costless access and report their information truthfully. If their interests conflict, they have to pay a higher contribution. [Lohmann \(1998\)](#) states that political decisions are often biased in favor of the special interest group at the cost of general public, and these are generally inefficient in the sense that losses incurred by the majority exceeds the gains enjoyed by the minority. The most important is that the incumbents increase their re-election chances by having a biased policy towards groups that are more engaged in monitoring their activities. [Wright \(1990\)](#) shows that the lobbying

efforts and campaign contributions from coalitions of groups are used to explain the representatives voting decisions within the US House Ways and Means and Agricultural Committees. In this case, campaign contributions prove somewhat useful for explaining groups lobbying patterns, whereas, [Austen-Smith and Wright \(1992\)](#) explore the limit to which special interest groups can affect the legislatures. These authors explain the importance of collecting costly information for a lobby group to put pressure on the legislators, when there exists another lobby which does not have the information. Their results state that the government takes better decisions with the special interest groups than without them.

Within the second type of the work, there are several papers which look at the conceptual work pertaining to the competition between political parties or the interest groups. Some of the important research relating to this topic include: [Becker \(1983\)](#), [Austen-Smith \(1987, 1993, 1995\)](#), [Baron \(1989, 1994\)](#), [Epstein and O'Halloran \(1995\)](#), [Gavious and Mizrahi \(2002\)](#), [Prat \(2002\)](#), [Coate \(2004\)](#), [Magee \(2007\)](#), [Borooah and Ploeg \(1983\)](#), [Coughlin, Mueller, and Murrell \(1990a,b\)](#), [Bennedsen and Feldmann \(2006\)](#), [Martimort and Semenov \(2007, 2008\)](#), [Cotton \(2012\)](#), and [Kroszner and Stratmann \(1998\)](#). [Becker \(1983\)](#) analyzes the model of competition among special interest groups for political influence and finds that an increase in the deadweight cost discourages the pressure by the subsidized groups but encourages the pressure by taxpayer groups. [Austen-Smith \(1987, 1993, 1995\)](#), [Baron \(1989, 1994\)](#), [Epstein and O'Halloran \(1995\)](#), [Gavious and Mizrahi \(2002\)](#), [Prat \(2002\)](#), [Coate \(2004\)](#), and [Magee \(2007\)](#) attempt to find the extent to which interest groups compete to affect the election outcome by using their campaign contributions. These authors are interested in analyzing the effects of campaign expenditure by special interest groups. [Austen-Smith \(1987\)](#) assumes that parties use campaign funds to alleviate (risk-averse) voters' uncertainty about candidate's policy positions. [Baron \(1989\)](#) analyzes the ability of the office holder to provide services to individuals and interest groups, who provide financial contributions for campaign expenditure. In a symmetric equilibrium, candidates make attractive contribution service offers if the valuation of the office is high and the cost of providing service is low, whereas [Baron \(1994\)](#) attempted to examine

the effect of campaign expenditure on the direct voting behavior of a group of uninformed voters. In all the three papers, lobbies take the platforms as given and offer assistance to their inclined parties to affect the election outcome.

[Epstein and O'Halloran \(1995\)](#) and [Gavious and Mizrahi \(2002\)](#) analyze the relationship between single as well as multiple interest groups with the political party/politicians. They find that, well before the election, the politicians in office invest a constant level of resources, while for a certain period close to the election they increase or decrease the investment, depending on the electoral significance of the interest group. This also proves the existence of electoral cycles. With respect to several interest groups, at each point in time, the politician invests in the group that contributes the most for her/ his political interest. [Prat \(2002\)](#) analyzes the campaign spending with office seeking politicians, rational voters, and multiple lobbies. He shows that the relationship between campaign spending and deviation from the median voters' preferred policy position reveal the value of lobbies' contributions. He evaluates the welfare implications if campaign spending is restricted and also empirically shows that the campaign expenditures have a very low effect on election outcomes. [Coate \(2004\)](#) presents a theory of political competition with campaign contributions and informative political advertising. Policy-motivated parties compete by selecting candidates and interest groups provide contributions to enhance the electoral prospects of like-minded candidates. Contributions are used to finance advertising campaigns that provide voters with information about candidate's ideology. [Magee \(2007\)](#) empirically investigates how interest groups use their campaign expenditure to affect the candidate's election outcome and not to influence candidate's policy choices directly. He finds that, by affecting the defense spending policies interest group influence the favorable candidates win the election.

[Borooh and Ploeg \(1983\)](#) and [Coughlin, Mueller, and Murrell \(1990a,b\)](#) analyze the electoral competition model with special interest group and find that the political parties in the model have equilibrium strategies that can be viewed as maximizing a social objective function. The strength of the interest group can be viewed as the

politician's perception of a group's reliability in delivering the votes of its members. [Coughlin, Mueller, and Murrell \(1990a\)](#) particularly look at how the government size responds to a change in the influence of the interest groups. They show that an increase in the groups influence does not cause the size of the government spending to increase in general, but does cause an increase when the government cannot change tax shares or find a group whose sole objective is to increase the consumption of the good. [Bennedsen and Feldmann \(2006\)](#) show that special interest groups use two instruments (collecting information for the policymaker or contributing to the government) as a substitute to affect the political decision making. That is, when groups are able to contribute financially to the government, they avoid collecting the information, whereas, in the presence of competition amongst the lobby groups, information search activities increase when groups are financially incapable to contribute. [Martimort and Semenov \(2007, 2008\)](#) and [Cotton \(2012\)](#) develop a model where interest groups compete to affect the policy maker through monetary contributions. In the former, the competition under asymmetry of information states that policies are systematically biased towards the decision maker's most favored point and it may sometimes lead to market determined equilibrium, where the decision-maker is not influenced by any groups. When there is uncertainty about the ideology of the policymaker then interest groups avoid contributing to the legislature. In [Cotton \(2012\)](#), politician can require political contributions in exchange for access to itself. He finds that rich do have better access (always) than the poor (sometimes), however, this does not imply that the rich groups are better off or the policies are biased towards them. Since, the rich group has more access to politicians; it is well compensated by its payment to the political parties/ politicians and in this case poor are better off, because poor groups are not targeted by politicians. The contribution limit reduces the politician's ability to extract rents from the interest groups. [Kroszner and Strattmann \(1998\)](#) develops a positive theory where interest group competition shapes the organization of the congress and uses it to explain campaign contribution patterns in financial services. Since, interest groups cannot impose any fee-for-service in the contract with legislators; the latter has the first hand incentive to create a standing

committee which will repeatedly look after the dealing between diverse interests and committee members. The equilibrium result supports high contributions and high legislative efforts for the special interests.

In the second type of the literature itself, some important research that uses game theoretic framework includes [Drazen, Limão, and Stratmann \(2007\)](#), [Boyce \(2000\)](#), and [Ainsworth \(1993\)](#) and the probabilistic voting models of [Lindbeck and Weibull \(1987\)](#) and [Dixit and Londregan \(1995\)](#). [Drazen, Limão, and Stratmann \(2007\)](#) uses a bargaining model and shows that even if there is a cap on the lobby's contribution which is not stringent, it improves its bargaining position relative to the politicians. Thus, it increases the lobby's pay off, which in turn raises the equilibrium number of lobbies when lobby formation is endogenous. The cap may also increase the aggregate contributions from lobbies and raise the politically motivated government spending. [Boyce \(2000\)](#) examines a two-period extension of the non-cooperative political pressure group competing model of [Becker \(1983\)](#). This paper derives the sub-game perfect equilibria and considers its welfare implications. He finds that the sub-game perfect equilibrium of this game is allocatively efficient if and only if the initial equilibrium is allocatively efficient, and the interest groups are equally clever at producing political pressure. If the rent seeking is constitutionally protected then the efficient equilibrium constrained by rent seeking is attainable by forcing winners in a political competition to fully compensate the losers. The game theoretic approach by [Ainsworth \(1993\)](#) analyze that, despite the absence of strict lobbies' regulation, the legislators have various instruments to control lobbying activities. The legislature adopts different means to reduce or limit the claim of the lobby groups and, hence, diminish the influence of the lobby groups. [Lindbeck and Weibull \(1987\)](#) and [Dixit and Londregan \(1995\)](#) use a probabilistic-voting approach, where the legislature designs the economic policies in such a way that the redistribution of income goes to the aimed interest groups. The important assumption of their model is that different groups have varied inclination toward the parties, which is observed by the parties based on their characteristics, and entails that these groups receive political donations from the government.

The Third type of papers that utilize a combination of analytical and empirical approach are - [Bonomo and Terra \(2010\)](#), [Bouton, Conconi, Pino, and Zanardi \(2013\)](#), [Bouton, Conconi, Pino, and Zanardi \(2014\)](#), [Goss \(2010\)](#), [Welch \(1980\)](#), [Etzioni \(1985\)](#), [Keiser and Jones Jr \(1986\)](#), [Fergusson \(2014\)](#), [Anzia \(2011\)](#), [Huber and Kirchner \(2013\)](#), [Kapur and Vaishnav \(2013\)](#), [Litschig \(2010\)](#), [Litschig and Morrison \(2010\)](#), [Sadiraj, Tuinstra, and Van Winden \(2010\)](#), and [Fiorino and Ricciuti \(2009\)](#). [Bonomo and Terra \(2010\)](#) explain that electoral cycles arise because of the interaction between lobbying power of the special interest group and voting power of the population. They explain electoral cycles in the context of government expenditure composition, aggregate expenditures and real exchange rates. [Bonomo and Terra \(2010\)](#) state that even if 90% of the citizens support the regulation on the open purchase of guns in US, they fail in the senate. This concept has been explained as the ‘paradox of guns’, which states that the ‘intensity of voters’ preferences differs across policy issues and voters have only one vote with which to hold politicians accountable on a bundle of issues. In fact, closer to the election, senators are more likely to vote for the pro-gun policy, and this is true with both, the financial contribution to the senators by gun lobbies and without it. [Bouton, Conconi, Pino, and Zanardi \(2014\)](#) set up the model and provides empirical evidence that voters vote on the basis of primary and secondary policy issues. The primary policy issues are mainly aimed at the citizen voters through public expenditure and the secondary might meant to gun control. [Goss \(2010\)](#) explains this as follows: the gun lobbies in US are powerful, well organized and willing to vote for and against the candidates purely on the basis of their position on gun control’. They are a ‘highly motivated’, ‘intense minority’, who prevail over a ‘relatively apathetic majority’.

[Welch \(1980\)](#) studies the interaction between 7 interest groups and 1974 candidates in the US and finds that interest groups contribute to get the political favor, not to affect the electoral outcome. However, mixed results cannot be ruled out in some cases. According to [Etzioni \(1985\)](#), public sees interest group as a threat to the pluralist democracy, but the conventional wisdom of the political science states that it is beneficial. In fact, the elimination of the interest group is not possible; rather

competing interest groups will curb each other. [Fergusson \(2014\)](#) examines the role of mass media in countering special interest group influence and finds that, by informing voters the mass media may reduce the influence of special interest groups. In fact, a better access to mass media allows voters to react to negative information about their candidates, and in particular, the influence of narrow interests in policy as proxied by their campaign finances profile. [Anzia \(2011\)](#) states that the off-cycle election attracts less voter turnout than the on-cycle election and argues that the decrease in the voter turnout in off-cycle election timing creates a strategic opportunity for organized interest group to intervene. Consequently, the official elected in off-cycle election is more favorable to the dominant interest group than otherwise. [Huber and Kirchler \(2013\)](#) investigate the effect of the return on stocks of companies owned by the financial contributors on the post election period in US from 1992 to 2004. They find that companies with higher percentage of contribution to the eventual winner in the election experience abnormal positive post-election returns, whereas, [Shen, Bui, and Lin \(2017\)](#) find that the firms who has benefitted from the proposed Three-Links policy of the winning party experienced positive stock returns during the Taiwanese presidential election and those who are threatened experience the negative returns. [Kapur and Vaishnav \(2013\)](#) examine one of the channels of illicit campaign finance in the India's real estate sector. Observably, politicians and builders engage in a quid pro quo, whereby the former channelize their illicit assets with the latter and the latter rely on the former for favorable dispensation during the election period. [Litschig \(2010\)](#) and [Litschig and Morrison \(2010\)](#) find that, in spite of the allocation rule based on local population, funds ended up being channelized to political allies as well as to communities likely to be swayed by economic benefits, exactly as theory would predict for discretionary transfers. [Sadiraj, Tuinstra, and Van Winden \(2010\)](#) find that the identification of voters with interest groups improves the electoral chances of the challenger. [Fiorino and Ricciuti \(2009\)](#) empirically investigate the role of the interest groups in public expenditure decisions in Italy from 1876 to 1913, and find that government spending is sensitive to the preferences of heavy industry rather than to those of textile and cereal cultivators.

Furthermore, our theoretical modeling is closely associated with the work by [Lambertini \(2001, 2014\)](#), which model the investment on advertisement and campaigns to increase vote share and win the election in private and social optimization set up. [Gavious and Mizrahi \(2002\)](#) model the constant investment by the parties on interest group/ groups, and in return, the latter provide financial contribution and congregate citizen voters for voting support to the former. Our paper extends the models of [Lambertini \(2001, 2014\)](#) and [Gavious and Mizrahi \(2002\)](#) in the following ways: (i) the spending on election campaign alone is not enough to attract voters, rather it also depends on the offer of the expenditure on public good and the structure of tax, which we model explicitly; (ii) [Lambertini \(2001, 2014\)](#) model campaign expenditure, but do not capture the source of it. In fact, often parties spend more than the stipulated amount by the election conducting authorities and, hence, the role of SIG cannot be denied. In our case, we introduce the role of SIG in the objective function separately, where it not only contributes financially to the parties for campaign advertisements but also has an expectation of receiving regulatory benefit in return. The departure from [Gavious and Mizrahi \(2002\)](#) is that, apart from the dynamic equation of the voting support for political parties/ politicians our model incorporates the dynamic constraint of financial contributions as well.

The basic results of Chapter 6 state that the closed-loop solution collapses to an open-loop one. That is, commitment to its own plan of action by the parties, given the initial state and time, results in the same outcome even if the political parties change their strategy based on the state at every point in time. The offer of the expenditure on public good is higher if per unit voting support is higher. The offer of higher expenditure also requires correspondingly larger lump-sum tax and higher withdrawal of voters relative to the discount factor (at which the accumulation of net voting support and financial contribution received build up). If the per unit voting support and financial contribution to party i is higher than party j and the voting support and financial contribution withdrawal is higher than the discount factor at which the accumulation of the net benefit of voting support and net financial contribution build up, political parties will offer a positive and higher expenditure on public good and

render a positive regulatory benefit in order to seek a larger share of voting support and financial contribution. The lower per unit cost of the offer of expenditure on public good and regulatory benefit enhance the offer of higher expenditure and regulatory benefit to receive larger voting share and financial contribution. The higher financial contributions of bribe also provide higher regulatory benefit to the SIG and larger voting share to the political party. The voting support and financial contribution received by party i will always be higher than party j 's if the per unit voting support and per unit financial contribution of bribe is higher for party i than party j . The outcomes at the private optimum are always higher than those at the social optimum in terms of the offer of expenditure on public goods and regulatory benefit by the political parties, voting support by citizen voters and financial contributions by the SIG. At the private optimum, the offer of expenditure on the public good tends toward overspending by the political party in response to the voting support that it receives from the voters. A corollary to this result is that, higher the voting support, higher is the offer of expenditure on public good by any political party. In comparison, again at the private optimum, the promise of regulatory benefit is more favorable, higher are the voting support from citizen voters and financial contributions from the SIG. The optimal solutions at the private and social optimum constitute a steady state saddle point equilibria.

In what follows, the individual research topics of the thesis are now presented in Chapters 3-6.

CHAPTER 3

Dynamics of Political Budget Cycle

3.1 Introduction

Drawing upon the psychological analysis in the realm of neuroscience, [Westen \(2008\)](#) derives from the brain scanning results that,

“...the political brain is an emotional brain. It is not a dispassionate calculating machine, objectively searching for the right facts, figures and policies to make a reasoned decision....”

[\(Westen, 2008\)](#).

He arrives at this conclusion by analyzing political advertisements (adverts) on television that, while banned in the United Kingdom (UK), are widely used in the United States of America (USA). He claims that these are significant budgetary items on which candidates spend millions of dollars. The author concludes that the Republicans understand what the philosopher, David Hume, recognized three centuries ago: that “reason is a slave to emotion, not the other way around”. The politicians play the emotive psychological strategies based on caste, race, religion, economic policies etc. The voters’ preferences may be defined over some necessities, which are enslaved to incumbent’s opportunism that voters may fail to understand. Among these, the economic policy making is one of the most talked about and used opportunistic tools for the incumbent.

In India, before the general elections of 2009, the central government's gross fiscal deficit to Gross Domestic product (GDP) ratio was 5.99% and 6.46% in the years 2008-09 and 2009-10 respectively, which had reduced to 4.79% in 2010-11. However, it was at a slightly lower value of 4.77% in 2013-14 and 5.20% in 2012-13 as compared to the previous general election year. Moreover, the data for 2013-14 were a budget estimate, and could have been higher from the prevailing level if the Fiscal Responsibility and Budget Management (FRBM Act-2003) was not effectual, which thus far was not enough.¹ This was a clear indication on the part of the incumbent's fiscal behavior to target the parliamentary election of 2014.

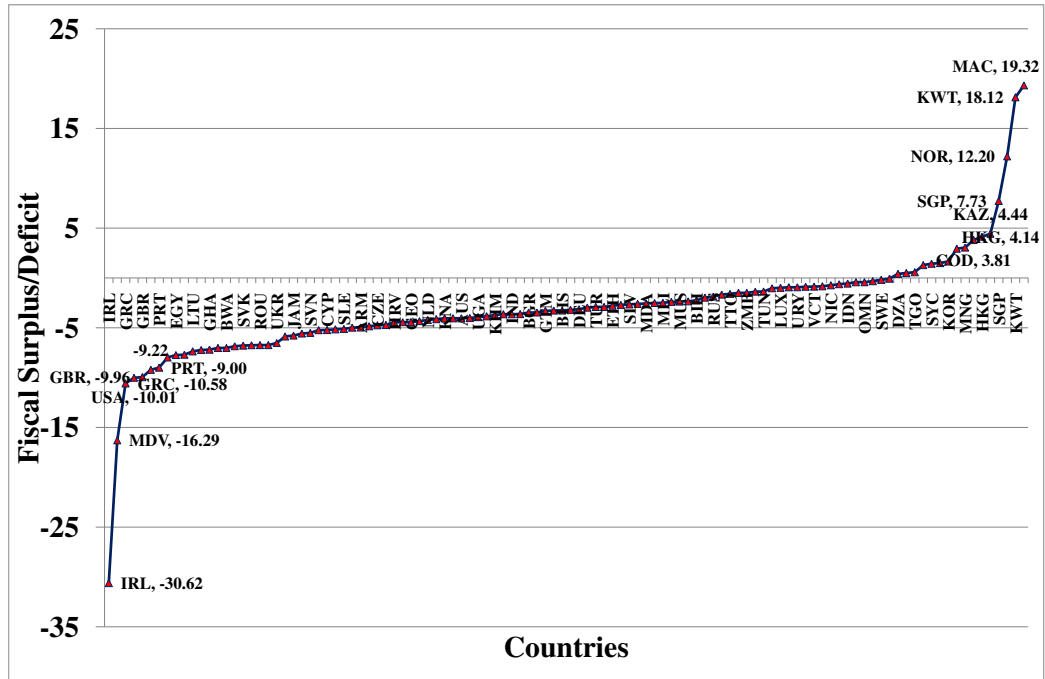
Against this backdrop, one of the most important motivating factors underlying this research is the following observed empirical regularity - why are most countries today positively skewed toward higher fiscal deficit? In 2010, of the 110 countries in our sample, a mere 14.54%, and in 2011, out of 103 countries, only around 19.41% were in cash surplus; the rest were running a deficit ([UNdata: A world of Information, World Bank Indicators, 08.02.2014/2014](#)).² The leading regions with at least 5% deficits

¹Fiscal Responsibility and Budget Management (FRBM) Act-2003 was introduced in the parliament on December 2000 and approved by cabinet of ministers of the Union Government of India in February, 2003 and finally been effective from July 5, 2004. The whole idea of FRBM was to ensure the transparent fiscal management and stability and finally moving to the balanced budget phenomenon in the federation as well as Union Government of India.

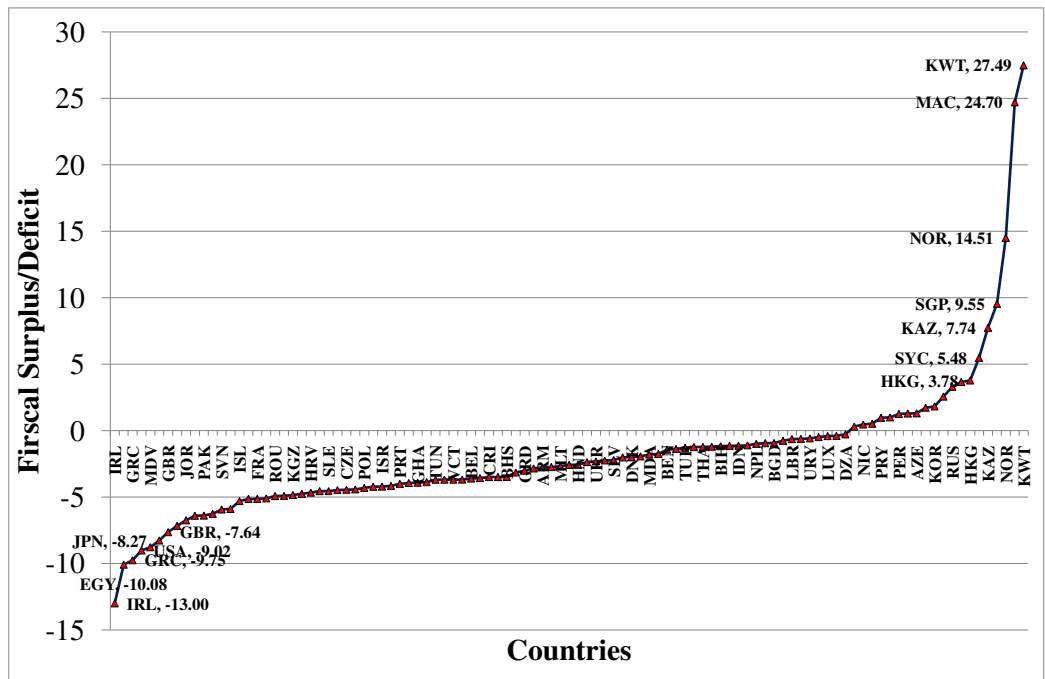
²Abbreviation of the Countries used in Figure 3.1: IRL-Ireland, MDV-Maldives, GRC-Greece, USA-United States, GBR-United Kingdom, ISL-Iceland, PRT-Portugal, BRB-Barbados, EGY-Egypt, Arab Rep., LBN-Lebanon, LTU-Lithuania, LKA-Sri Lanka, GHA-Ghana, FRA- France, BWA- Botswana, LVA-Latvia, SVK- Slovak Republic, JPN-Japan, ROU-Romania, POL-Poland, UKR-Ukraine, KEN-Kenya, JAM-Jamaica, JOR-Jordan, SVN-Slovenia, ESP-Spain, CYP-Cyprus, MYS-Malaysia, SLE-Sierra Leone, PAK- Pakistan, ARM- Armenia, KGZ-Kyrgyz Republic, CZE-Czech Republic, ISR-Israel, HRV-Croatia, BFA-Burkina Faso, GEO-Georgia, CRI-Costa Rica, NLD-Netherlands, COL-Colombia, KNA-St. Kitts and Nevis, ZAF-South Africa, AUS-Australia, SRB-Serbia, UGA-Uganda, ITA-Italy, KHM-Cambodia, MLT-Malta, IND-India, HUN-Hungary, BGR-Bulgaria, PHL-Philippines, GTM-Guatemala, AUT-Austria, BHS-Bahamas, The, BEL-Belgium, DEU-Germany, HND-Honduras, TUR-Turkey, DOM-Dominican Republic, ETH-Ethiopia, NZL-New Zealand, SLV-El Salvador, FIN-Finland, MDA-Moldova, DNK-Denmark, MLI-Mali, GRD-Grenada, MUS-Mauritius, MAR-Morocco, BIH-Bosnia and Herzegovina, CAN-Canada, RUS-Russian Federation, BRA-Brazil, TTO-Trinidad and Tobago, BLR-Belarus, ZMB-Zambia, NPL-Nepal, TUN-Tunisia, BEN-Benin, LUX-Luxembourg, BGD-Bangladesh, URY-Uruguay, LBR-Liberia, VCT-St. Vincent and the Grenadines, LAO-Lao PDR, NIC-Nicaragua, THA-Thailand, IDN-Indonesia, CHL-Chile, OMN-Oman, AZE-Azerbaijan, SWE-Sweden, EST-Estonia, DZA-Algeria, PER-Peru, TGO-Togo, PRY-Paraguay, SYC-Seychelles, AFG-Afghanistan, KOR-Korea, Rep., QAT-Qata, MNG-Mongolia, COD-Congo, Dem. Rep., HKG-Hong Kong SAR, China, KAZ-Kazakhstan, SGP-Singapore, NOR-Norway, KWT-Kuwait, MAC-Macao SAR, China.

Figure 3.1: Fiscal Surplus (+)/ Deficit (-) in the World Economy

(a) 2010



(b) 2011



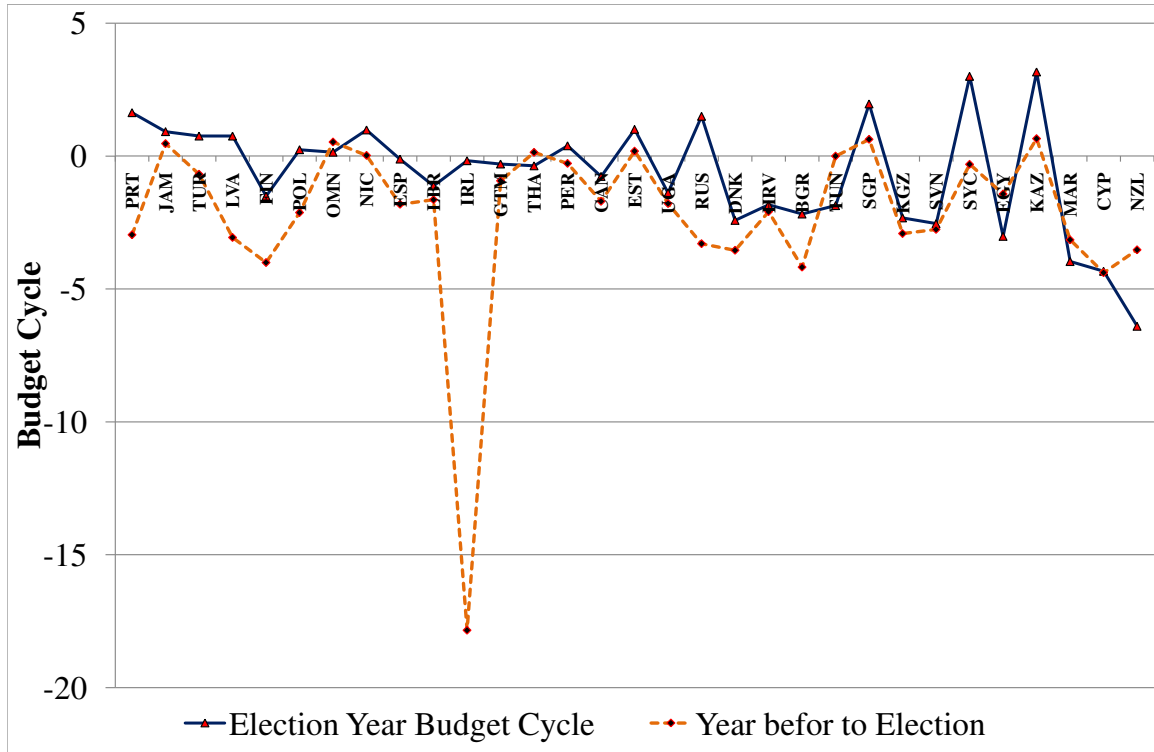
Source: UNdata: A world of Information, World Bank Indicators (08.02.2014/2014).

in 2010 and 2011 were North America, high income OECD members, and the East Asian Pacific countries. The below 5% countries were the Euro Area, South Asia, lower middle income Europe and Central Asia. Figure 3.1 shows the fiscal surplus/deficit in different countries, ranked from the highest deficit to the highest surplus (in percent).

Figure 3.2 shows the election year and year before the election fluctuations in fiscal deficit from the average fiscal deficit in the electoral term. The year of election is 2011, where the form of election could refer to general assembly, assembly and presidential election in the selected countries. In Figure 3.2, the dark blue line depicts the deviation of the election year deficit from the average deficit of the last five years, including the election year fiscal deficit. Similarly, the dotted line is the deviation of the budgetary deficit immediately before the election from the average of last four years values, including the year before the election. As can be seen, the deviation of the budget deficit from the average in the year before the election points toward fiscal manipulation by higher spending in the years close to the election year. In both, the election year and the year before it, in most of the cases, the countries are found to be running a higher deficit as compared to the average. In the case of some of the European countries the politically motivated fiscal deficit can be spurious as these two years (2010 and 2011) were affected by the ‘sovereign debt crises’; still there are large number of countries, where fiscal deficits are higher, for which we cannot deny a political motivation. Interestingly, the fiscal deficit pattern also seems to be exceedingly more in the year before the election than the election year itself. It is possible that the targeted expenditure on public goods well before the election (year before the election), can deliver the service by the date of election and, finally, could mobilize substantial voting support in the incumbent’s favor.³

³Abbreviation for those countries where election took place in 2011: Portugal-PRT, Jamaica-JAM, Turkey-TUR, Latvia-LVA, Finland-FIN, Poland-POL, Oman-OMN, Nicaragua-NIC, Spain-ESP, Liberia-LBR, Ireland-IRL, Guatemala-GTM, Thailand-THA. Peru-PER, Canada-CAN, Estonia-EST, Uganda-UGA, Russian Federation-RUS, Denmark-DNK, Croatia-HRV, Bulgaria-BGR, Tunisia-TUN, Singapore-SGP, Kyrgyz Republic-KGZ, Slovenia-SVN, Seychelles-SYC, Egypt, Arab Rep.-EGY, Kazakhstan-KAZ, Morocco-MAR, Cyprus-CYP, New Zealand-NZL.

Figure 3.2: Budget Cycle in the World Economy in 2011



Source: UNdata: A world of Information, World Bank Indicators (08.02.2014/2014).

The most general way of analytically modeling economic decision making by a social planner, rests on the assumption of a benevolent motive, where the incumbent politician tries to distribute the expenditure on public goods based on its relative economic importance required for the sustained economic development. However, in real economies, the decision making process of the government is not free from political motivations. Often, a government can opportunistically expand public spending before the election to attract voters. Alternatively, it may be characterized by partisan behavior in which different politicians have varied fiscal preferences, indicative of heterogeneous preferences of voters. In either case, since the notion of fiscal deficit is not easily understood by the common citizen-voter, she/ he may often run into “fiscal illusion”.⁴ In the earlier literature, the concept of balanced budget has been well ac-

⁴The concept came from Amilcare Puviani’s ‘Financial Theory of Illusion’. Fiscal Illusion is the situation when revenue and expenditure structure is not fully known/ controlled by tax payers. This is the situation, when taxpayers are misled by their perception of feeling good (even though that might not be the case) about overall reduction in taxation or an increase in expenditure on public goods without any increase in taxation.

cepted by economists, but in recent Keynesian economies, fiscal deficit has been used as a driving force for higher growth. In fact, in today's globalized world, the number of countries running into fiscal deficit is higher than the number of countries running a surplus, and in many cases, the governments tend to create a higher deficit just before the year of election. In fact, [Alesina and Perotti \(1995b\)](#) has also suspected the persistence fiscal deficit as the possibility of opportunistic manipulation of fiscal deficit by the government.

Although, the notion of political business cycle was propounded by [Kalecki \(1943\)](#), it was re-invented by [Nordhaus \(1975\)](#) and [Hibbs \(1977\)](#). [Nordhaus \(1975\)](#) considered an opportunistic pre-electoral manipulation of economic policies (that is, inflation-unemployment cycles) by the incumbent to raise the chances of getting re-elected, whereas, [Hibbs \(1977\)](#) explained the post-electoral cycles due to varied macroeconomic goals of policy makers, popularly known as partisan cycles. Both of these first-generation studies assumed a seemingly irrational behavior of the citizen-voters and relied on monetary policy as the driving force. Alongside, there was the emergence of several seminal empirical papers, such as those by [Kramer \(1971\)](#), [Tufte \(1975\)](#), and [Fair \(1978\)](#), which examined the economic determinants of US congressional voting.

In order to counter the conceptual criticisms meted out to this early strand of literature that utilized the notion of irrationality of voters, and reliance on monetary policy for electoral manipulation, there emerged the second-generation models in the mid-80s. The papers that fall under this category are the ones by [Cukierman and Meltzer \(1986\)](#), [Rogoff and Sibert \(1988\)](#), [Rogoff \(1990\)](#), and [Persson and Tabellini \(1990\)](#) that deal with an opportunistic model in a rational expectations framework. Also, in the 1980s and 1990s, a new game theoretic approach evolved to understand the macroeconomic behavior. These models utilized the notion of rational expectations that restricted the magnitude of opportunism toward exploiting the Phillips curve. In an opportunistic model with rational expectations, it was assumed that the incumbent cannot fool the voters time after time, and the voters understood the trade-off between unemployment and inflation, and they might even punish the incumbent.

Persson and Tabellini (1990) introduced the notion of competency in the Nordhaus (1975) version of the Phillips curve. These authors focused on the competency of the candidate along with the asymmetry of information on the observation of inflation and output. For instance, they stated that, “one candidate may be particularly able (or unable) to cope with a shock in the price of oil, or to enact the effective labor market legislation, or to negotiate with trade unions” (Persson and Tabellini, 1990, pp. 80). The political parties behave opportunistically to display their competency in the election. The informed guess by voters could be that if the policymaker was competent yesterday, she will be competent even tomorrow. A competent policy maker expands the economic activity (pre-electoral boom) immediately before the election, and voters observe this to re-elect the policymaker. The political business cycle would exist with one type of policy maker (competent in this case), which voters will vote based on competency. This model was silent about the post-electoral recession. Rogoff and Sibert (1988) and Cukierman and Meltzer (1986) together proposed the model of competency with regard to the government budget and not the Phillips curve. The government expenditure was financed by lump-sum taxes and seigniorage revenue. The competency term was the additional factor in the government’s budget constraint. Rogoff and Sibert (1988) derived that each type of policymaker, with the exception of the least competent one, tended to distort the pre-electoral fiscal policies. Rogoff (1990) set up a model similar to Rogoff and Sibert (1988), where government expenditure and public investment were depicted as a function of lump-sum taxes and competency. Here, the politician was assumed to have better information about his own level of competency than did the voters. Voters could not observe competency directly nor could they immediately infer it from the fiscal policy, because they did not observe all the government expenses. In fact, voters used a part of the government spending they incurred before an election to make an inference about post-electoral competency. Consequently, this resulted in an incentive for the incumbent who was contesting to be re-elected to increase spending on those goods which were more visible to voters before the election. Cukierman and Meltzer (1986) proposed another competency-based model consistent with pre-electoral policy distortion. Even in this

model authors explained that, due to asymmetry of information between the government and voters, the incumbent had an incentive to distort economic policy in the election period.

The opportunistic Political Budget Cycle (PBC) from the first, to the second-generation models differed in terms of moving from the assumption of adaptive expectations to rational expectations. The rational opportunistic model contrasted with the shortcomings of the models with adaptive expectations. However, the first-generation model provided better room to exploit the Phillips curve under irrational citizen-voters. While the major implications were similar, the two differed in their policy consequences (fiscal deficit/ surplus in this case). In the adaptive expectations framework, both monetary and fiscal policies were found to be more effective in creating the desired macroeconomic cycles as compared to the rational expectations framework, which was mainly a consequence of irrationality of voters. So, the electoral effects tended to persist for a longer duration in the traditional models than the rational expectations version. In the traditional (adaptive expectations) model, every government (partisan or opportunistic) was identical in behavior, whereas in the rational expectations version, the incumbents often behaved less opportunistically and followed the optimal policy rule for the economy.

In the partisan model, rational expectations and price rigidities were introduced by [Alesina \(1987\)](#) after widespread criticism was meted out to the exploitable Phillips curve based monetary model of political business cycle. [Alesina \(1987\)](#) considered rational expectations with partisan post-electoral political cycles (as against the adaptive expectations) in his earlier work. Alesina's rational partisan model concluded that in the first half of the elected term, unemployment was lower and inflation higher under the left-wing government than the right-wing government. Since, expectations were formed before the election in the first half term, so after the election, the left-wing win implied higher inflation than anticipated while the right-wing victory meant that inflation was lower than expected. Moreover, there was no economic fluctuation in the second half term because the identity of the party in power was revealed as

the wage contracts were signed. In contrast, [Hibbs \(1977\)](#) stated that the overall economic activity was higher in the left-wing government than the right-wing government in their respective administrative span. [Alesina \(1987\)](#) also faced a number of criticisms. The concept of the Phillips curve talked about the implicit contract of the workers in the first term under uncertainty of election outcome. [Garfinkel and Glazer \(1994\)](#) suggested that the problem of uncertainty could be resolved by simply postponing the contract by workers till the election outcome was known. Thus, there was a clear tendency toward delaying the contract until after the election results, because expectations would be formed based on which type (left- or right-wing) government came to power.

Interestingly, there exists select literature that examines the possibility of merging of both - opportunistic and partisan - versions of the model. [Alesina and Rosenthal \(1995\)](#) have made some effort in this direction to merge the concept of competency with partisan behavior of the government. Authors claim that a partisan and opportunist incumbent might be compatible with each other. In fact, [Frey and Schneider \(1978a\)](#) find that the partisan politician becomes opportunist when the election time approaches and she/ he is in the danger of losing the election, whereas they go for their partisan goals when they are electorally confident. Moreover, the opportunistic behavior of different partisan politicians may be different. Adjusting the party's standing position toward the 'middle' might be the most effective opportunist policy for a partisan politician. Thus, we cannot ignore the possibility of partisan politician to play a mixed role - being an opportunist when in the office, and being partisan when outside the office.

Following varying criticisms of the opportunistic and partisan models, [Drazen \(2000\)](#) proposed a new model of PBC, based on [Rogoff \(1990\)](#). [Drazen \(2000\)](#) extended the model by including both monetary and fiscal policy with opportunistic and forward looking citizen voters to capture the PBC, popularly known as "Active-Fiscal Passive-Monetary (AFPM)". In this case, the incumbent government could directly influence the fiscal policy, but monetary policy was controlled by the monetary authority as

an independent central bank. However, monetary authority could be exploited to accommodate fiscal decisions of the incumbent. [Drazen \(2000\)](#) also presented the non-parametric empirical evidence in favor of AFPMP.

In fact, most of the recent research tries to explain the economic cycles by including the fiscal policy in the model, for example - [Alesina and Perotti \(1995a\)](#), [Drazen \(2000\)](#), [Persson and Tabellini \(2002\)](#), and more recently by [Aidt, Veiga, and Veiga \(2011\)](#), [Klomp and De Haan \(2013a,b\)](#), and [Chortareas, Logothetis, and Papandreu \(2016\)](#). [Drazen and Eslava \(2010\)](#) and [Brender and Drazen \(2013\)](#) analyze the composition of government spending (rather than aggregate spending) as used by the incumbent as an electoral tool. Their findings state that rational voters support the opportunist government which, in fact, incurs the targeted expenditure in the economy prior to the election. [Brender and Drazen \(2013\)](#) find that an established democracy changes the composition more frequently than the new ones. [Aidt, Veiga, and Veiga \(2011\)](#) find that opportunistically motivated incumbent spend more on visible goods close to the election whereas, [Klomp and De Haan \(2013a,b\)](#) find that in most of the countries, fiscal policy is not affected by the elections. [Chortareas, Logothetis, and Papandreu \(2016\)](#) find that there is strong evidence of pre-electoral increased expenditure and excess borrowing in Greece's municipality.

It is within this body of research that our paper aims to extend the models of opportunistic and partisan politics by incorporating the time-dynamics of voting support and budgetary deficit, just prior and post the election period, orchestrated through changes in fiscal policy. Using a complete information framework, we characterize the time path of both opportunistic and partisan government using budgetary deficit as the policy tool.

The chapter utilizes an optimal control model of the incumbent government that is politically motivated. The government maximizes its utility that is a weighted sum of utility from voting support and dis-utility from budget deficit, where the latter is implied by a large enough government expenditure on (may be) populist economic policies (not modeled explicitly). The economy consists of a continuum of rational

citizen-voters, who vote for the incumbent government or the opponent party (which is also implicit) based on the economic performance of the former, wherein the voters are assumed to care about the expenditure on public good and the level of fiscal deficit in the economy. The citizen-voters are favorable toward the incumbent's economic performance below an acceptable level of budgetary deficit. If instead the budgetary deficit exceeds a certain threshold level, it generates a dis-utility for the incumbent politician in terms of loss of voting support, to the extent that voters might even vote her/ him out. In fact, 'some', deficit in the economy might be good if an economy is spending on investment for higher economic growth. However, a large magnitude of expenditure entails future tax, which voters might not like and, hence, the expenditure pattern has to be contained below at certain threshold level such as in India, where it has been decided to maintain its fiscal deficit at 3% of GDP under FRBM Act (2003).

The analysis in this chapter characterizes two types of the incumbents - opportunist and partisan, which is an important contribution of this research. The opportunist politician aims to mobilize voting support by manipulating economic policies, while the partisan politician has clearly defined economic policy preferences - reflecting the heterogeneous preferences of different voter-groups. Specifically, by characterizing the opportunistic or partisan behavior through use of different combination of parameters of the model, the paper derives interesting implications for the time path of voting support and budgetary deficit for each type during the election cycle. The paper is also extended to include the possibility of anti-incumbency and understand its implications on voting support for the opportunistic and partisan incumbent. To the best of our knowledge, this contribution is unique in terms of looking at voting behavior vis-à-vis fiscal deficit in a dynamic optimal control setting defined in finite time.

The key results derived are:

- The opportunist and partisan cycles follow a similar time path, albeit the former is more pronounced than the latter, especially prior to the election period.

- The voters render a positive voting support in case of both opportunist and partisan incumbent, but the presence of anti-incumbency would imply rejecting the same in the opportunistic case.
- The acceptable higher deficit is not as such bad in the modern economy however, creating budgetary deficit above a threshold will be costlier in the opportunistic case than the partisan one. That is, the deviation of budgetary deficit from the benchmark will be more pronounced in the case of an opportunistic incumbent than a partisan one.
- The votes garnered per unit of deficit incurred would be less in the opportunistic case than in the partisan case. It implies that the opportunist incumbent will have to incur larger deficits to earn higher voting support per unit of the deficit.

The specific contributions of this paper are that, when the opportunist and partisan cycles coexists (as is the case here), we attempt to find an answer to the question as to why should these be seen as different, particularly close to the election? Also, most of PBC analyses have been done in infinite horizon and have focused the voters' welfare, and not the incumbent's. In this respect, this research constitutes an important contribution with its focus on a finite time horizon dynamic analysis of the behavior of the incumbent politician.

The chapter is organized as follows. Section 3.2 introduces the basic analytical model and derives the optimal path for voting support and budgetary deficit, based on the interaction between the incumbent and the citizen-voters. Section 3.3 characterizes the behavior of the opportunist incumbent, while Section 3.4 analyzes the case of the partisan incumbent. The role of anti-incumbency (with opportunistic behavior) is also characterized in Section 3.3, whereas anti-incumbency in partisan case does not satisfy the regularity condition (as will be explained later), and hence, excluded. Section 3.5 concludes.

3.2 The Model

Consider an economy with the incumbent politician and a continuum of citizen-voters. The incumbent incurs the budgetary expenditure on public goods as well as it strives to get back to power in the next election. That is, the incumbent is not benevolent and her/ his objective function is a weighted sum of utility from voting support and dis-utility from budgetary deficit. Often the deficit is run to provide for ‘populist’ or ‘visible’ expenditure as in [Aidt, Veiga, and Veiga \(2011\)](#). Accordingly, the optimization problem of the incumbent is defined over the finite time interval $[0, T]$ and is mathematically expressed as:

$$\underset{\{D(t)\}}{\text{Max}} \int_0^T e^{-\rho t} \frac{[M(t) - \delta(D(t) - D^*)]^{1-\epsilon}}{1-\epsilon} dt, \quad (3.1)$$

subject to,

$$\dot{M}(t) = \alpha D(t) - \gamma M(t), \quad M(0) = M_0 > 0, \quad M(T) \text{ free}, \quad (3.2)$$

$$G(t) = \tau(t) + D^* + \eta(t) \Rightarrow D(t) - D^* = \eta(t), \quad (3.3)$$

where $\rho > 0$ in eq. (3.1) is the discount rate, $M(t)$ is the voting support by the citizen-voters that is treated as the state variable, and $D(t)$ is deficit incurred due to expenditure on public goods in the economy that constitutes the control variable. The parameters ϵ and δ respectively capture the intertemporal elasticity of substitution, and the weight on dis-utility from budgetary deficit relative to utility from voting support. The equation of motion of $M(t)$ in eq. (3.2) is positively related to the level of deficit run in the economy, and this positive relationship has been depicted by the parameter α . Moreover, it is negatively related to the existing level of support, $M(t)$, whose strength is captured by the parameter γ , also called the friction parameter.⁵

⁵Note that, as more and more voting support is rendered to the incumbent, there will be more withdrawal (friction) of the citizen voters, which may also be due the presence of an alternative party in the political arena.

Most logically, we assume that $\alpha > \gamma$. $G(t)$ is the aggregate government expenditure defined as the sum of $\tau(t)$, government tax revenue, and $\eta(t)$, which is the deficit shock to the economy in eq. (3.3). Note that $\eta(t)$ impacts the economy positively or negatively depending on $D(t) - D^* \leq 0$. That is, the citizen voters are negatively affected by the budget deficit exceeding the threshold because this would entail a future cost of higher taxation and, hence, a loss in their welfare.

The scrap value function can be written as (see also Chiang, 1992, pp. 181-183),

$$[M(T) - M^*]\lambda_M(T) = 0; \quad (3.4)$$

where, $\lambda_M(\cdot)$ is costate variable associated with the state change equation in (3.2). That is, the scrap value condition at the terminal time period is, $\lambda_M(T) \geq 0$ which implies that $[M(T) - M_{min}]\lambda_M(T) = 0$. Notice that, from eq. (A.6) (in Appendix A) at $t = T$ we have, $\lambda_M(T) = Z_m > 0$, which further implies that $M(T) = M_{min}$, where, M_{min} is some minimum level of voting support incumbents get at the terminal time T .

Given a politically inclined incumbent, the possibility of a budgetary deficit being very large near the election period is not ruled out, as the government attempts to woo the voters by massive spending on visible public goods in the economy rather than being concerned about the consequent high fiscal deficit. However, the government would tend to trade-off the utility from this deficit in terms of voting support garnered as against the dis-utility from excessive levels of deficit.

3.2.1 Optimal Time Path

The Hamiltonian for the optimization program described in the previous section can be expressed as:

$$H(t) = \frac{[M(t) - \delta(D(t) - D^*)]^{1-\epsilon}}{1-\epsilon} e^{-\rho t} + \lambda_M(t)[\alpha D(t) - \gamma M(t)]. \quad (3.5)$$

Solving the optimal control problem, we get that,

$$\begin{aligned} \frac{\partial H(t)}{\partial D(t)} &= 0, \\ \Leftrightarrow \delta[M(t) - \delta(D(t) - D^*)]^{-\epsilon} e^{-\rho t} &= \alpha \lambda_M(t), \end{aligned} \quad (3.6)$$

$$\begin{aligned} \text{and, } \dot{\lambda}_M(t) &= -\frac{\partial H}{\partial M(t)} \Leftrightarrow \\ \Leftrightarrow \dot{\lambda}_M(t) - \gamma \lambda_M(t) &= -[M(t) - \delta(D(t) - D^*)]^{-\epsilon} e^{-\rho t}, \end{aligned} \quad (3.7)$$

and the state variable $M(t)$ must adhere to the time path defined by

$$\dot{M}(t) = \alpha D(t) - \gamma M(t). \quad (3.8)$$

The solution to this program yields the optimal time path of voting support rendered to the incumbent by the citizen-voters, that is, $M(t)$, and that of fiscal deficit incurred on account of government expenditure on public goods, captured by $D(t) - D^*$.

Proposition 1: *The equilibrium level of voting support offered to the incumbent by the citizen-voters, $M(t)$, and the magnitude of excessive fiscal deficit run by the incumbent, $D(t) - D^*$, are found to be:*

$$\begin{aligned} M(t) &= \left[M_0 + \frac{\alpha \delta D^*}{\alpha - \delta \gamma} \right] e^{(\frac{\alpha - \delta \gamma}{\delta})t} - \frac{\alpha \delta D^*}{\alpha - \delta \gamma} \\ &+ \frac{(\frac{\alpha}{\delta})^{\frac{\epsilon-1}{\epsilon}} (Z_m)^{-\frac{1}{\epsilon}} e^{-\frac{1}{\epsilon} e^{-\frac{(\alpha - \delta \gamma)}{\delta \epsilon} T}}}{\frac{\epsilon-1}{\delta \epsilon}} \left[\frac{e^{(\frac{\alpha - \delta \gamma - \delta \rho}{\delta \epsilon})t} - e^{(\frac{\alpha - \delta \gamma}{\delta})t}}{(\alpha - \delta \gamma) + \frac{\delta \rho}{\epsilon - 1}} \right] \end{aligned} \quad (3.9)$$

$$= \underbrace{\Gamma_1 e^{(\frac{\alpha - \delta \gamma}{\delta})t} - \Gamma_2}_{(+)} + \underbrace{\frac{\Gamma_3 e^{(\frac{\alpha - \delta \gamma}{\delta \epsilon})(t-T)}}{\frac{\epsilon-1}{\delta \epsilon}} \left[\frac{e^{-\frac{\rho}{\epsilon}t} - e^{(\frac{\epsilon-1}{\delta \epsilon})(\alpha - \delta \gamma)t}}{\Gamma_4} \right]}_{(+)/(-)} \geq 0; \quad (3.10)$$

$$D(t) - D^* = \frac{1}{\delta} M(t) - \delta^{\frac{1-\epsilon}{\epsilon}} (\alpha Z_m)^{-\frac{1}{\epsilon}} e^{-\frac{\rho}{\epsilon}t + (\frac{\alpha - \delta \gamma}{\delta \epsilon})(t-T)} \quad (3.11)$$

$$\begin{aligned} &= \underbrace{\frac{\Gamma_1}{\delta} e^{(\frac{\alpha - \delta \gamma}{\delta})t} - \frac{\Gamma_2}{\delta}}_{(+)} \\ &+ \underbrace{\frac{\Gamma_3}{\alpha} e^{(\frac{\alpha - \delta \gamma}{\delta \epsilon})(t-T)} \left[\frac{\frac{\alpha}{\delta} (e^{-\frac{\rho}{\epsilon}t} - e^{\frac{\epsilon-1}{\delta \epsilon}(\alpha - \delta \gamma)t}) - \frac{\epsilon-1}{\delta \epsilon} \Gamma_4 e^{-\frac{\rho}{\epsilon}t}}{\Gamma_4} \right]}_{(+)/(-)} \geq 0, \end{aligned} \quad (3.12)$$

where $\Gamma_1 = M_0 + \frac{\alpha \delta D^*}{\alpha - \delta \gamma}$, $\Gamma_2 = \frac{\alpha \delta D^*}{\alpha - \delta \gamma}$, $\Gamma_3 = (\frac{\alpha}{\delta})^{\frac{\epsilon-1}{\epsilon}} (Z_m)^{-\frac{1}{\epsilon}}$ and $\Gamma_4 = (\alpha - \delta \gamma) + \frac{\delta \rho}{\epsilon - 1}$. The

detailed derivations for the expressions in (3.10) and (3.12) can be found in Appendix A. In general, in eq. (3.10), the sum of the first two terms in the r.h.s. is non-negative, in view of $e^{\frac{(\alpha-\delta\gamma)}{\delta}t} - 1 \geq 0$, while the third term is ambiguous in sign, since ϵ in general can be ≥ 1 , and $e^{-\frac{\rho}{\epsilon}t} - e^{(\frac{\epsilon-1}{\delta\epsilon})(\alpha-\delta\gamma)t} \geq 0$ according as $(1-\epsilon) \geq \frac{\delta\rho}{(\alpha-\delta\gamma)}$. Following the same reasoning, in the r.h.s. of eq. (3.12) as well, the sum of the first two terms is positive, while the third term is ambiguous in sign. Thus, in general, both $M(t)$ and $D(t) - D^*$ are ambiguous in sign.

3.2.2 Regularity Conditions

Since the optimal time paths defined in eqs. (3.10) and (3.12) are dependent on several parameters, namely, ρ , α , γ , δ , ϵ , and D^* , we need to derive the regularity condition(s) that would ensure that a well-defined solution to the cumulative discounted utility for the incumbent exists. By substituting the solutions for $M(t)$ and $D(t) - D^*$ in the welfare function in (3.1) we get,

$$U = \int_0^T \frac{\left(\frac{\alpha Z_m}{\delta}\right)^{\frac{\epsilon-1}{\epsilon}}}{1-\epsilon} e^{(1-\epsilon)\left(\frac{\alpha-\delta\gamma}{\delta\epsilon}\right)(t-T) - \frac{\rho}{\epsilon}t} dt, \quad (3.13)$$

a sufficient condition for which to be positive is

$$\epsilon < 1 \quad \text{such that } \epsilon \geq 1 \text{ is ruled out.} \quad (3.14)$$

The expression in eq. (3.13) can be solved to yield

$$U = \frac{\left(\frac{\alpha Z_m}{\delta}\right)^{\frac{\epsilon-1}{\epsilon}}}{\frac{(\epsilon-1)^2}{\delta\epsilon}} \left[\frac{e^{-\frac{\rho}{\epsilon}T} - e^{\frac{\epsilon-1}{\delta\epsilon}(\alpha-\delta\gamma)T}}{(\alpha - \delta\gamma) + \frac{\delta\rho}{\epsilon-1}} \right], \quad (3.15)$$

which, if positive, implies that the ratio

$$\frac{e^{-\frac{\rho}{\epsilon}T} - e^{\frac{\epsilon-1}{\delta\epsilon}(\alpha-\delta\gamma)T}}{(\alpha - \delta\gamma) + \frac{\delta\rho}{\epsilon-1}} > 0.$$

This entails the necessary conditions that

$$\text{either } e^{-\frac{\rho}{\epsilon}T} - e^{\frac{\epsilon-1}{\delta\epsilon}(\alpha-\delta\gamma)T} > 0 \Rightarrow (\alpha - \delta\gamma) + \frac{\delta\rho}{\epsilon - 1} > 0 \Leftrightarrow 1 - \epsilon > \frac{\rho\delta}{\alpha - \delta\gamma}, \quad (3.16)$$

$$\text{or } e^{-\frac{\rho}{\epsilon}T} - e^{\frac{\epsilon-1}{\delta\epsilon}(\alpha-\delta\gamma)T} < 0 \Rightarrow (\alpha - \delta\gamma) + \frac{\delta\rho}{\epsilon - 1} < 0 \Leftrightarrow 1 - \epsilon < \frac{\rho\delta}{\alpha - \delta\gamma}. \quad (3.17)$$

The two necessary conditions, eqs. (3.16) and (3.17) have an intuitive appeal for our analysis. An important feature of this research is the characterization of the role of opportunism and partisan behavior of the incumbent in terms of the implications for the time path of budgetary deficit and voting support. Since, an opportunistic incumbent is primarily interested in garnering votes, and manipulates budgetary deficit toward the end, she/ he is assumed to have the willingness to accept large fluctuations in utility from voting support, net of dis-utility from fiscal deficit. Parametrically, this is captured by a low enough value of ϵ and an assignment of a sufficiently low weight on utility loss from fiscal deficit, implied by a small enough value of δ . Notably, the regularity condition in eq. (3.16) satisfies these parametric restrictions. The opposite is true for a partisan incumbent, who has distinct preferences on economic policies. This implies a low willingness to tolerate fluctuations in utility over time and a high dis-utility from budgetary deficit, indicated by a high enough value of ϵ and δ . Crucially, the regularity condition in eq. (3.17) corresponds to this case. As will be seen, both eqs. (3.16) and (3.17) will play an important role in defining the time path of the incumbent depending on whether she/ he displays an opportunist or a partisan behavior.

3.3 Opportunist Incumbent

The opportunist incumbent government is assumed to be the one which is more likely to adopt populist policies in the time period closer to the election, and accordingly runs a higher fiscal deficit than D^* . Generally, an opportunist is willing to accept sharp variations in marginal utility from voting support over time, and has a small enough marginal utility loss from excessive fiscal deficit. As discussed, the parametric

configuration in this case is characterized by $1 - \epsilon > \frac{\rho\delta}{\alpha - \delta\gamma}$.

3.3.1 Opportunist Incumbent in the Absence of Anti-incumbency

Given the parametric restriction in eq. (3.16),

Proposition 2: *In the case of an opportunist incumbent and no anti-incumbency, if $\alpha > \gamma$ such that $\alpha > \delta\gamma$, ϵ and δ are both positive but small enough (or even close to zero), $0 < \rho < 1$, and $1 - \epsilon > \frac{\rho\delta}{\alpha - \delta\gamma}$, the optimal level of voting support from citizen-voters, $M(t)$, defined in eq. (3.10) will be strictly positive.*

The proof proceeds as follows. Since we are analyzing the case of the incumbent politician, the initial level of voting support, $M_0 > 0$ and large. Moreover, in view of $\alpha > \gamma$ and $e^{(\frac{\alpha - \delta\gamma}{\delta})t} - 1 > 0$, the first term $\Gamma_1 e^{(\frac{\alpha - \delta\gamma}{\delta})t}$ will tend to dominate the second term, Γ_2 . Also, in the opportunistic case, the ratio $\left[\frac{e^{-\frac{\rho}{\epsilon}t} - e^{\frac{\epsilon - 1}{\delta\epsilon}(\alpha - \delta\gamma)t}}{\Gamma_4} \right]$ in the third term of eq. (3.10) is positive (from eq.(3.16) both the numerator and denominator of this ratio are positive). However, δ and ϵ being very small make the values of both $e^{-\frac{\rho}{\epsilon}t}$ and $e^{\frac{\epsilon - 1}{\delta\epsilon}(\alpha - \delta\gamma)t}$ in the third term rather small, implying that their difference will also be small enough. Further, the term in the denominator, that is, $\frac{\epsilon - 1}{\delta\epsilon}$, will be large (again from δ and ϵ being small enough) and negative. Using the same reasoning, Γ_3 will be small enough and $e^{(\frac{\alpha - \delta\gamma}{\delta})(t - T)}$, although rising, will also be very small. Thus, the entire third term will be small enough (in fact, in the special case of $\epsilon \rightarrow 0$, the entire third term will vanish). Overall, the first two terms will tend to dominate the third term, implying that the optimal level of voting support ($M(t)$) will be positive.

Proposition 3: *Given an opportunist incumbent, absent anti-incumbency, and the parametric restrictions as in Proposition 2, the government deficit that is run, in terms of $D(t) - D^*$, characterized by eq. (3.12) will also be positive.*

The proof proceeds as follows. Again, $M_0 > 0$ and large. Also, with opportunism, $e^{-\frac{\rho}{\epsilon}t} - e^{\frac{\epsilon - 1}{\delta\epsilon}(\alpha - \delta\gamma)t} > 0$ implies that $\Gamma_4 > 0$. Further, under the assumption that $\epsilon < 1$ and very small in magnitude, $\left[\frac{\alpha}{\delta} \left(e^{-\frac{\rho}{\epsilon}t} - e^{\frac{\epsilon - 1}{\delta\epsilon}(\alpha - \delta\gamma)t} \right) - \frac{\epsilon - 1}{\delta\epsilon} \Gamma_4 e^{-\frac{\rho}{\epsilon}t} \right] > 0$ but very

small. Since the values of δ and ϵ are very small (even close to zero), the denominator of the third term in eq. (3.12), which is $\frac{\epsilon-1}{\delta\epsilon}$, will be very large and negative. Similarly, $e^{\frac{\alpha-\delta\gamma}{\delta\epsilon}(t-T)}$ is increasing albeit very small. Consequently, the third term of eq. (3.12) will be small enough. (In fact, it would also tend to vanish as $\epsilon \rightarrow 0$.) Thus, the third term would be dominated by the first two terms, where the first term is already larger than the second, implying that optimal deficit, $D(t) - D^*$, will be positive.

It will be interesting to observe in the next proposition that in view of small enough values of δ (that capture the incumbent's opportunism) the time path of $D(t) - D^*$ will always lie above that of $M(t)$. This means that the opportunist incumbent will have to spend more in terms of budgetary deficit for garnering each unit of voting support.

In the case of an opportunist incumbent, and absence of anti-incumbency, a higher budgetary deficit just prior to the election is likely to entail higher future taxation in the post-election period. In response to this, will the rational citizen-voters punish the government if the incumbent exceeds the deficit beyond a threshold level? We find that this is not true in this case. That is,

Proposition 4: *In case of an opportunist incumbent with $\alpha > \gamma$ such that $\alpha > \delta\gamma$ and ϵ and δ being positive but very small (even close to zero), and $0 < \rho < 1$,*

(i) the pay-off to the incumbent in terms of voting support from citizen-voters steadily increases right up to the election time period, T . That is, $\frac{\partial M(t)}{\partial t} > 0$ and $\frac{\partial \eta(t)}{\partial t} > 0$;

(ii) in order to mobilize an additional unit of voting support, the opportunist government will have to run an incrementally higher level of government deficit. Specifically, $\frac{\partial \eta(t)}{\partial t} > \frac{\partial M(t)}{\partial t}$.

The detailed derivation of the Proposition 4 has been done in Appendix A. The proof of Proposition 4(i) proceeds as follows. We first look at the change in voting support over time, by substituting for $D(t)$ from eq. (3.12) into eq. (3.8). From the regularity condition in eq. (3.16), at any time $t < T$, we have (a) $\epsilon < 1$, and from the parametric restrictions imposed for the opportunist incumbent, we have (b) $\frac{\alpha-\delta\gamma}{\delta\epsilon}(t-T) - \frac{\rho}{\epsilon}t < 0$,

which increases and approaches $-\frac{\rho}{\epsilon}T$ as $t \rightarrow T$.⁶ Further, in the last term in eq. (3.18), the value of $(Z_M)^{-\frac{1}{\epsilon}}$ will be very small as ϵ is very small or even close to zero. For the same reason, the value of $(\frac{\alpha}{\delta})^{\frac{\epsilon-1}{\epsilon}}$ will also be very small. Thus, the magnitude of the last term in eq. (3.18) is negligible, and the change in voting support over time will be determined by the sum of the first two terms, both of which are positive (from $\alpha > \delta\gamma$). That is,

$$\frac{\partial M(t)}{\partial t} = \left(\frac{\alpha - \delta\gamma}{\delta} \right) M(t) + \alpha D^* - \left(\frac{\alpha}{\delta} \right)^{\frac{\epsilon-1}{\epsilon}} (Z_M)^{-\frac{1}{\epsilon}} e^{-\frac{\rho}{\epsilon}t + \frac{\alpha - \delta\gamma}{\delta\epsilon}(t-T)} > 0. \quad (3.18)$$

As for the voting support, the change in the path of the fiscal deficit will also be positive as $t \rightarrow T$. The change in deficit over time is derived by differentiating $D(t) - D^*$ in eq. (A.7) with respect to t to get the expression in (3.19). In eq. (3.19), $\alpha^{\frac{\epsilon-2}{\epsilon}}\delta^{\frac{1-2\epsilon}{\epsilon}}$ can be re-expressed as $\alpha^{(-\frac{1}{\epsilon}-1)}(\frac{\delta}{\alpha})^{\frac{1-2\epsilon}{\epsilon}}$. Note that, for ϵ very small (or close enough to zero), both $\alpha^{(-\frac{1}{\epsilon}-1)}$ and $(\frac{\delta}{\alpha})^{\frac{1-2\epsilon}{\epsilon}}$ will be very small or close to zero. Similarly, the value of $(Z_M)^{-\frac{1}{\epsilon}}$ will be very small in magnitude. Furthermore, as explained in the result for the change in voting support, from (b) the power of the exponential expression in the third term will be negative, and will approach $-\frac{\rho}{\epsilon}T$ as $t \rightarrow T$. On account of this, the exponential term will rise, albeit to a small enough value since ϵ is very small, or close to zero. On the whole, the third term will approach a small enough value. Hence, even in this case, the first two terms will be dominating, and the deficit will rise over time. That is,

$$\begin{aligned} \frac{\partial \eta(t)}{\partial t} &= \left(\frac{\alpha - \delta\gamma}{\delta^2} \right) M(t) + \frac{\alpha D^*}{\delta} \\ &\quad - \alpha^{\frac{\epsilon-2}{\epsilon}}\delta^{\frac{1-2\epsilon}{\epsilon}} Z_M^{-\frac{1}{\epsilon}} \left[\frac{(1 + \epsilon)\alpha - \delta(\gamma + \rho)}{\epsilon} \right] e^{-\frac{\rho}{\epsilon}t + \frac{\alpha - \delta\gamma}{\delta\epsilon}(t-T)} > 0 \end{aligned} \quad (3.19)$$

where, $\eta(t) = D(t) - D^*$. Hence, both $\frac{\partial M(t)}{\partial t} > 0$ and $\frac{\partial \eta(t)}{\partial t} > 0$.

We next turn to 4(ii). With $\delta < 1$, from eq. (3.11), we will have $\frac{\partial \eta(t)}{\partial M(t)} = \frac{1}{\delta} > 1$. Intuitively, in order to garner an additional unit of voting support, the opportunist government will have to spend incrementally more in the form of budgetary deficit.

⁶From eq. (3.18), the part of the last term $e^{-\frac{\rho}{\epsilon}t + \frac{\alpha - \delta\gamma}{\delta\epsilon}(t-T)}$ can be written as $e^{-\frac{\rho}{\epsilon}t} e^{\frac{\alpha - \delta\gamma}{\delta\epsilon}(t-T)}$. That is, as $t \rightarrow T$ and small enough ϵ we have $e^{-\frac{\rho}{\epsilon}t} \rightarrow 0$ and $e^{\frac{\alpha - \delta\gamma}{\delta\epsilon}(t-T)} \rightarrow 1$.

We now analyze the behavior of $M(t)$ and $\eta(t)$ in the initial time period, $t = 0$ and the terminal (election) time period, $t = T$.

Proposition 5: *In case of an opportunist incumbent, when $\alpha > \gamma$ such that $\alpha > \delta\gamma$, and both ϵ and δ are positive but very small (even close to zero), and $0 < \rho < 1$,*

(i) the level of voting support at $t = 0$ will be $M(t) = M_0 > 0$ and the initial level of incumbent's budget deficit will be $D(t) - D^ > 0$;*

(ii) the terminal time period values of voting support and path of deficit are such that $M(t) < M(T)$ and $\eta(t) < \eta(T)$.

The proof of Proposition 5(i) proceeds as follows. As $t \rightarrow 0$, in eq. (3.10), the last term in the r.h.s. of the solution to $M(t)$ drops out. Furthermore, in the first term, $\left(\frac{\alpha\delta D^*}{\alpha - \delta\gamma}\right) e^{(\frac{\alpha - \delta\gamma}{\delta})t}$ is equivalent to $\left(\frac{\alpha\delta D^*}{\alpha - \delta\gamma}\right)$, which balances out with the third term. Thus, the level of voting support at $t = 0$ is found to be:

$$M(t) = M_0 > 0. \quad (3.20)$$

As for the level of government budgetary deficit at $t = 0$, from eq. (3.12), from the parametric restrictions for the opportunist, in the second term in the r.h.s., $(\alpha Z_m)^{-\frac{1}{\epsilon}}$ will be very small for small enough values of ϵ . Similarly, $\delta^{\frac{1-\epsilon}{\epsilon}}$ will be small, as by assumption, δ is small enough in this case. Furthermore, since $\alpha > \delta\gamma$, where δ and ϵ are very small, $e^{-\left(\frac{\alpha - \delta\gamma}{\delta\epsilon}\right)T}$ will also be very small, even when T is finite. Consequently, $-(\alpha Z_m)^{-\frac{1}{\epsilon}} \delta^{\left(\frac{1-\epsilon}{\epsilon}\right)} e^{-\left(\frac{\alpha - \delta\gamma}{\delta\epsilon}\right)T}$ will be very small implying that

$$D(t) - D^* = \frac{M_0}{\delta} - (\alpha Z_m)^{-\frac{1}{\epsilon}} \delta^{\left(\frac{1-\epsilon}{\epsilon}\right)} e^{-\left(\frac{\alpha - \delta\gamma}{\delta\epsilon}\right)T} > 0. \quad (3.21)$$

We now proceed to the proof for Proposition 5(ii). Evaluating eqs. (3.10) and (3.12) at $t = T$, the levels of voting support and government deficit in the terminal time can

be expressed as:

$$M(T) = \left[M_0 + \frac{\alpha \delta D^*}{\alpha - \delta \gamma} \right] e^{(\frac{\alpha - \delta \gamma}{\delta})T} - \frac{\alpha \delta D^*}{\alpha - \delta \gamma} + \frac{(\frac{\alpha}{\delta})^{\frac{\epsilon - 1}{\epsilon}} Z_m^{-\frac{1}{\epsilon}}}{\frac{\epsilon - 1}{\delta \epsilon}} \left[\frac{e^{-\frac{\rho}{\epsilon}T} - e^{(\frac{\epsilon - 1}{\epsilon})(\frac{\alpha - \delta \gamma}{\delta})T}}{(\alpha - \delta \gamma) + \frac{\delta \rho}{\epsilon - 1}} \right] \quad (3.22)$$

$$= \Gamma_1 e^{(\frac{\alpha - \delta \gamma}{\delta})T} - \Gamma_2 + \frac{\Gamma_3}{\frac{\epsilon - 1}{\delta \epsilon}} \left[\frac{e^{-\frac{\rho}{\epsilon}T} - e^{(\frac{\epsilon - 1}{\epsilon})(\frac{\alpha - \delta \gamma}{\delta})T}}{\Gamma_4} \right]; \quad (3.23)$$

$$D(T) - D^* \equiv \eta(T) = M(T) - \delta^{\frac{1 - \epsilon}{\epsilon}} (\alpha Z_m)^{-\frac{1}{\epsilon}} e^{-\frac{\rho}{\epsilon}T} = \left[\frac{M_0}{\delta} + \frac{\alpha D^*}{\alpha - \delta \gamma} \right] e^{(\frac{\alpha - \delta \gamma}{\delta})T} - \frac{\alpha D^*}{\alpha - \delta \gamma} \quad (3.24)$$

$$+ \frac{(\alpha Z_m)^{-\frac{1}{\epsilon}} \delta^{\frac{1 - \epsilon}{\epsilon}}}{\frac{\epsilon - 1}{\delta \epsilon}} \left[\frac{\frac{\alpha}{\delta} (e^{-\frac{\rho}{\epsilon}T} - e^{\frac{\epsilon - 1}{\delta \epsilon}(\alpha - \delta \gamma)T}) - \frac{\epsilon - 1}{\delta \epsilon} [(\alpha - \delta \gamma) + \frac{\delta \rho}{\epsilon - 1}] e^{-\frac{\rho}{\epsilon}T}}{(\alpha - \delta \gamma) + \frac{\delta \rho}{\epsilon - 1}} \right] = \frac{\Gamma_1}{\delta} e^{(\frac{\alpha - \delta \gamma}{\delta})T} - \frac{\Gamma_2}{\delta} + \frac{\frac{\Gamma_3}{\alpha}}{\frac{\epsilon - 1}{\delta \epsilon}} \left[\frac{\frac{\alpha}{\delta} (e^{-\frac{\rho}{\epsilon}T} - e^{\frac{\epsilon - 1}{\delta \epsilon}(\alpha - \delta \gamma)T}) - \frac{\epsilon - 1}{\delta \epsilon} \Gamma_4 e^{-\frac{\rho}{\epsilon}T}}{\Gamma_4} \right] \quad (3.25)$$

In view of the parametric restrictions for the opportunist incumbent's pay-off, the first terms, namely, $\Gamma_1 e^{(\frac{\alpha - \delta \gamma}{\delta})T}$ and $\frac{\Gamma_1}{\delta} e^{(\frac{\alpha - \delta \gamma}{\delta})T}$ in eqs. (3.23) and (3.25) respectively, are positive. Also, in view of $\alpha > \delta \gamma$ and $e^{(\frac{\alpha - \delta \gamma}{\delta})T} - 1 > 0$, the first terms in both, eqs. (3.23) and (3.25), will tend to dominate the respective second terms, which are Γ_2 and $\frac{\Gamma_2}{\delta}$. We now focus on the respective third terms in eqs. (3.23) and (3.25). From the regularity condition in eq. (3.16), the ratio in eq. (3.23), which is $\left[\frac{e^{-\frac{\rho}{\epsilon}T} - e^{\frac{\epsilon - 1}{\delta \epsilon}(\alpha - \delta \gamma)T}}{\Gamma_4} \right] \equiv \left[\frac{e^{-\frac{\rho}{\epsilon}T} - e^{\frac{\epsilon - 1}{\delta \epsilon}(\alpha - \delta \gamma)T}}{(\alpha - \delta \gamma) + \frac{\delta \rho}{\epsilon - 1}} \right]$ is positive (the line of argument here follows the ones in Propositions 2 and 3.). As the value of ϵ and δ are sufficiently small, $\frac{\epsilon - 1}{\delta \epsilon}$ in the denominator in both eqs. (3.23) and (3.25) will be very large. Also, in the numerator in eq. (3.23), we have $\Gamma_3 = (\frac{\alpha}{\delta})^{\frac{\epsilon - 1}{\epsilon}} (Z_M)^{-\frac{1}{\epsilon}}$, where ϵ being very small, both $(\frac{\alpha}{\delta})^{1 - \frac{1}{\epsilon}}$ and $(Z_M)^{-\frac{1}{\epsilon}}$ will be close enough to zero. Hence, in view of the denominator being very large and the numerator very small, the entire third term in both eqs. (3.23) and (3.25) will be sufficiently close to zero. Consequently, the sum of the first two terms (which is positive) will tend to dominate the third term implying that $M(T) > 0$ and $\eta(T) > 0$. Furthermore, $\Gamma_1 e^{(\frac{\alpha - \delta \gamma}{\delta})T} > \Gamma_1 e^{(\frac{\alpha - \delta \gamma}{\delta})t}$ will imply that $M(T) > M(t)$. A similar argument applies for $\eta(T)$, such that $\eta(T) > \eta(t)$. Thus,

these rankings will be true $\forall t < T$.

The outcomes in Propositions 2, 3, 4 and 5 are also corroborated by numerical simulations (using MATLAB-12), whose results are presented in the following section. Importantly, the numerical values assigned to the parameters satisfy the regularity conditions for the opportunistic case, as stated in eq. (3.16).

3.3.1.1 Numerical Simulations

The parametric configurations for the opportunistic incumbent are compiled in Table 3.1 To begin with, some parameters are assigned fixed values in case of all the four

Table 3.1: Parametric Configurations in Case of Opportunist Incumbent and No Anti-incumbency

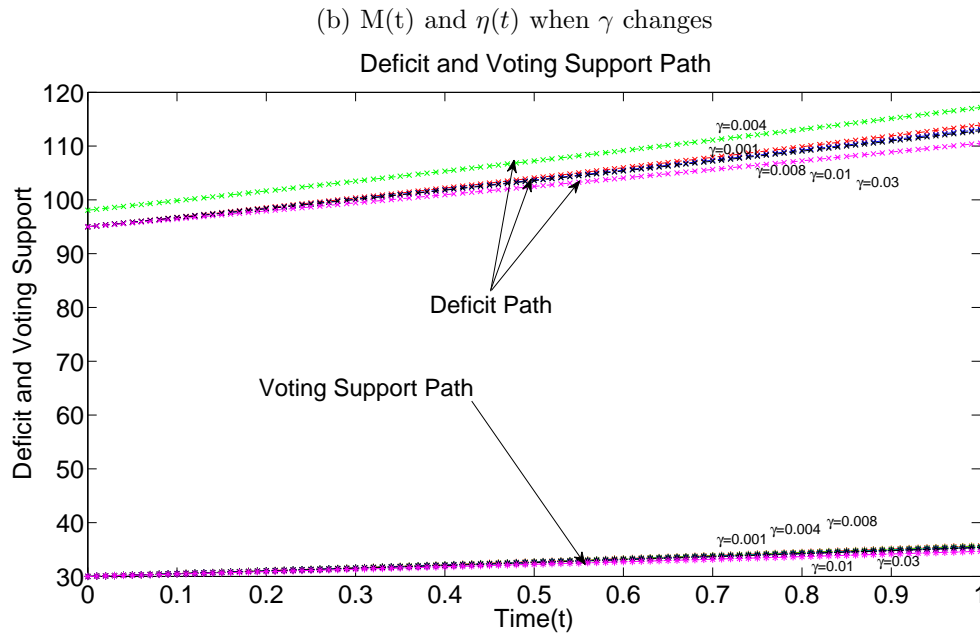
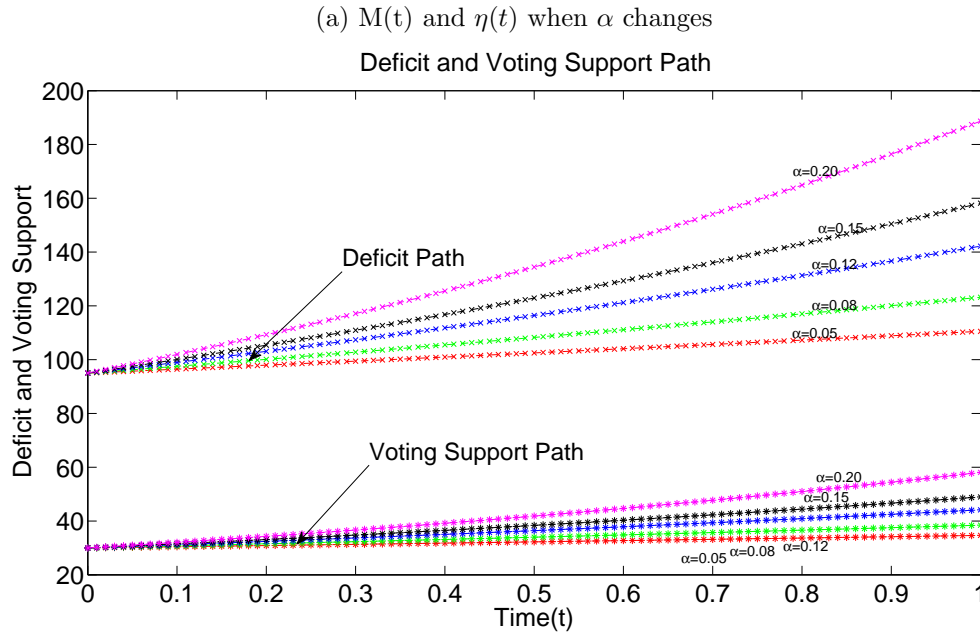
Name of the Parameters	Parameters	Change in Parameters Values	Fixed Parameters
Minimum Voting Support	M_0	-	30
Benchmark Deficit	D^*	-	5
Constant part of Shadow Value	K_M	-	20
Sensitivity of Deficit to Voting Support	α	0.05, 0.08, 0.12, 0.15, 0.25	$\gamma = 0.03, \delta = 0.3, \epsilon = 0.05, \rho = 0.02$
Friction Parameter Gamma	γ	0.001, 0.004, 0.008, 0.01, 0.03	$\alpha = 0.05, \delta = 0.3, \epsilon = 0.05, \rho = 0.02$
Weight to $D(t) - D^*$ verses $M(t)$	δ	0.10, 0.15, 0.25, 0.30, 0.45	$\alpha = 0.05, \gamma = 0.03, \epsilon = 0.05, \rho = 0.02$
Marginal Elasticity of Substitution	ϵ	0.01, 0.03, 0.05, 0.08, 0.12	$\alpha = 0.05, \gamma = 0.03, \delta = 0.3, \rho = 0.02$
Discount Factor	ρ	0.02, 0.03, 0.05, 0.08, 0.10	$\alpha = 0.05, \gamma = 0.03, \delta = 0.3, \epsilon = 0.05$

simulations. That is, $M_0 = 30$, $D^* = 5$ and $K_M = 20$. As explained earlier, that $M_0 > 0$ and high enough is plausible follows from the fact that we are modeling the case of the incumbent politician. Next, by changing the other parameters, namely, α , γ , δ , ϵ and ρ , one at a time, we trace the time path of voting support and deficit in Figures 3(a) to 3(e). Notably, $t = 0$ and $T = 1$ represent respectively the year after the last election and the year of next election. It is straightforward to observe that,

Proposition 6(s): *Under different numerical parametric configurations, all of which satisfy the regularity condition in eq. (3.16), there is a continuous increase in voting support and budgetary deficit over time span $t = 0$ to $T = 1$.*

In Figure 3.3 (3.3a), even when the value of α is increased from $\alpha = 0.05$, to $\alpha = 0.08, 0.12, 0.15$, and 0.20 , where α represents the relationship between change in voting support and level of deficit, the positive and rising time trend in $M(t)$ and $\eta(t)$

Figure 3.3: Time Path of Voting Support $M(t)$ and Fiscal Deficit $\eta(t)$ of the Opportunist Incumbent



Source: Author's calculations

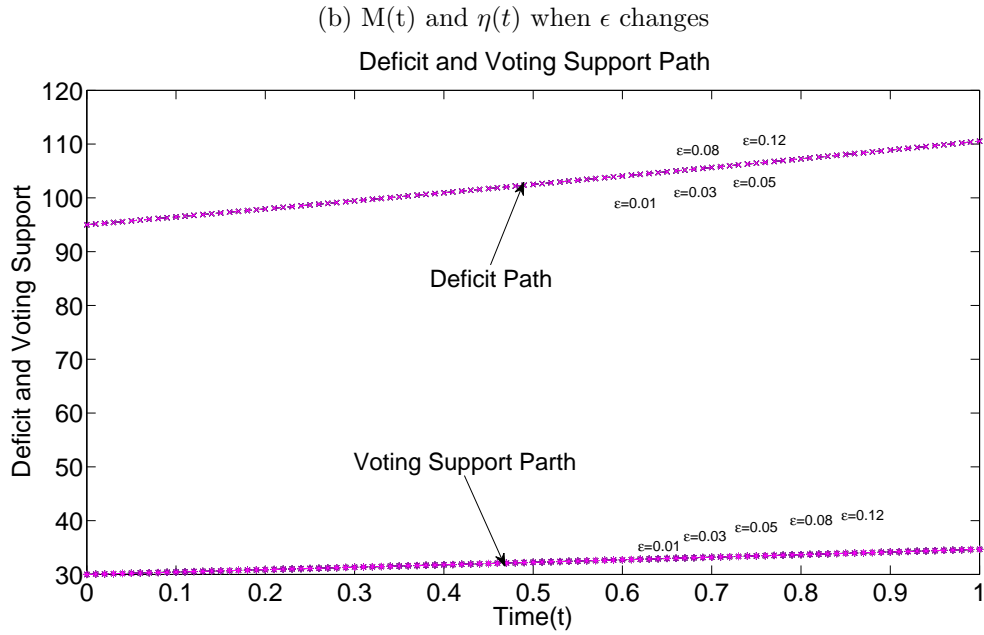
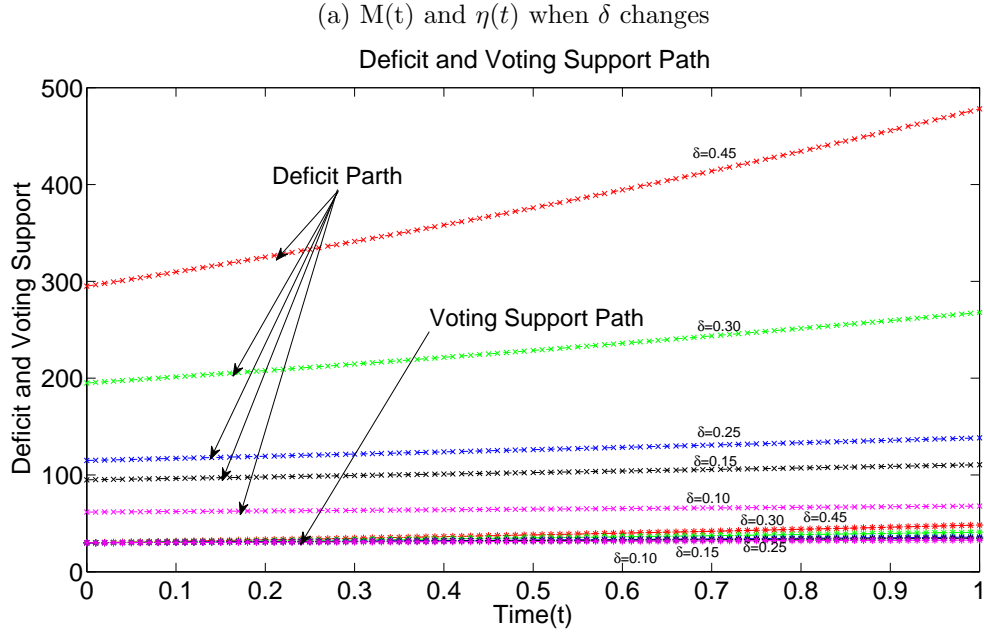
persists. Notably, however, for every additional unit of voting support the incumbent wants to garner, she/ he will have to run an incrementally higher level of fiscal deficit in the economy. In Figure 3.3 (3.3b) the value of γ is changed from $\gamma = 0.001$, to $\gamma = 0.004, 0.008, 0.01$, and 0.03 , while keeping all the other parameters as $\alpha = 0.05$,

$\delta = 0.3$, $\epsilon = 0.05$ and $\rho = 0.02$. The behavior of voting support path and deficit in Figure 3.3b shows the same pattern as in Figure 3.3a. Similarly, Figure 3.4 (3.4a) depicts a continuous rise in the level of deficit and voting support when we keep as constant the following parameters $\alpha = 0.05$, $\gamma = 0.03$, $\epsilon = 0.05$ and $\rho = 0.02$ and vary δ from $\delta = 0.10$ to $\delta = 0.15, 0.25, 0.30$, and 0.45 . In this case, δ denotes the relative weight on the deviation of actual budgetary deficit from the benchmark level, $D(t) - D^*$, relative to the voting support, $M(t)$. As discussed earlier, ϵ and ρ respectively denote the incumbent's intertemporal elasticity of substitution and the rate of time preference. Figure 3.4 (3.4b) also displays a continuous rise in the level of deficit and voting support, with fixed parameters, $\alpha = 0.05$, $\gamma = 0.03$, $\delta = 0.3$ and $\rho = 0.02$, while the level of incumbent's intertemporal elasticity of substitution is varied as follows: $\epsilon = 0.001, 0.004, 0.008, 0.01$, and 0.03 . Finally, in Figure 3.5, the rate of time preference parameter, ρ , changes as follows: from $\rho = 0.02$ it rises to $\rho = 0.03, 0.05, 0.08$, and 0.10 , while we maintain the values of the other parameters as $\alpha = 0.05$, $\gamma = 0.03$, $\delta = 0.3, \epsilon = 0.05$. The simulations support our earlier theoretical result that lower is the weight on the $D(t) - D^*$, as compared to the voting support, $M(t)$, higher is the required incremental change in the deficit path for every unit change in the voting support over time.

3.3.2 Opportunist Incumbent in the Presence of Anti-Incumbency

In this case, while the incumbent government continues to be an opportunist, the response of the voters is not supportive on account of the presence of anti-incumbency. In general, anti-incumbency could be ascribed to a high enough friction amongst the citizen voters toward the incumbent, either due to the presence of a competent challenger as an alternative, or due to a very high cost of rendering support to the incumbent (both of which are not modeled explicitly here). Instead, for our analysis, the presence of anti-incumbency is captured by a high enough value of the friction parameter, γ , relative to α . Eqs. (3.10) and (3.12) now yield that,

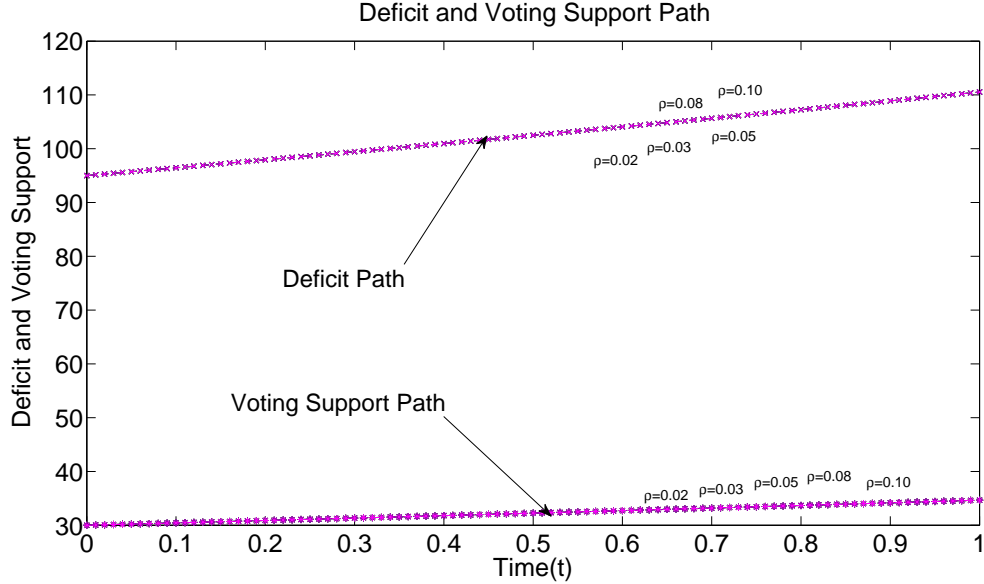
Figure 3.4: Time Path of Voting Support $M(t)$ and Fiscal Deficit $\eta(t)$ of the Opportunist Incumbent



Source: Author's calculations

Proposition 7: *In the case of an opportunist incumbent and the presence of anti-incumbency, captured by $\alpha < \gamma$, such that $\alpha < \delta\gamma$, ϵ and δ continue to be both positive but very small (even close to zero), $0 < \rho < 1$, and $1 - \epsilon > \frac{\rho\delta}{\alpha - \delta\gamma}$, the optimal level of voting support from citizen-voters, $M(t)$, defined in eq. (3.10) is found to be positive.*

Figure 3.5: Time Path of Voting Support $M(t)$ and Fiscal Deficit $\eta(t)$ of the Opportunist Incumbent when ρ Changes



Source: Author's calculations

Moreover, with anti-incumbency, $M(t)$ will be falling over time.

This can be proved as follows. In view of $\alpha < \gamma$ such that $\alpha < \delta\gamma$, we have the first term, $\Gamma_1 e^{\frac{\alpha-\delta\gamma}{\delta}t}$, as positive but smaller in magnitude than in case of no anti-incumbency. Moreover, the second term, Γ_2 , in the r.h.s. of eq. (3.10) is negative, implying that the difference of the first two terms is positive, especially in view of $M_0 > 0$ and large. Furthermore, on account of opportunism, the numerator and denominator of the ratio in the second term of eq. (3.10), that is, $\frac{e^{-\frac{\rho}{\epsilon}t} - e^{-\frac{\epsilon-1}{\delta\epsilon}(\alpha-\delta\gamma)t}}{(\alpha-\delta\gamma) + \frac{\delta\rho}{\epsilon-1}}$, will have the same (positive) sign, implying that the ratio will be positive. However, in view of both ϵ and δ small enough, the difference of the two terms in the numerator will be small. Further, in the third term again, Γ_3 is small enough in magnitude and $e^{\frac{\alpha-\delta\gamma}{\delta\epsilon}(t-T)}$ will be larger than in case of no anti-incumbency (from $\alpha < \delta\gamma$ and $t \leq T$) albeit declining overtime and converging to 1 as $t \rightarrow T$. As $\epsilon < 1$ and both ϵ and δ are very small, the entire third term will be very small in magnitude and will be dominated by the sign of the first two terms. Thus, the optimal voting support, $M(t)$, will be positive.

As for the change in voting support over time, from eq. (3.18) it is easy to infer that

the effect of the first term, $(\frac{\alpha-\delta\gamma}{\delta}) M(t) < 0$ (from $\alpha < \delta\gamma$) will be the dominant one, while the second term remains positive. The third term is small enough in magnitude, on account of ϵ and δ being small, and is dominated by the sign of the first term. Thus, in the presence of anti-incumbency we get, $\frac{\partial M(t)}{\partial t} < 0$.

Proposition 8: *When the incumbent is an opportunist and there is presence of anti-incumbency, which is captured by $\alpha < \gamma$, such that $\alpha < \delta\gamma$, ϵ and δ continue to be both positive but very small (even close to zero), $0 < \rho < 1$, and $1 - \epsilon > \frac{\rho\delta}{\alpha-\delta\gamma}$, the government deficit in terms of $D(t) - D^*$, defined in eq. (3.12), is also found to be positive but continuously declining over time.*

That optimal $D(t) - D^* > 0$ follows from $M(t) > 0$ and δ being small enough, both of which imply that the first term in eq. (3.12) will dominate the remaining terms that are small enough in magnitude on account of both ϵ and δ being small enough (or even close to zero). Similar to the change in voting support over time, from eq. (3.19), the change in budgetary deficit will also be determined by the sign of the first term, which is a scale up of the first two terms of eq. (3.18), namely, $\frac{1}{\delta} [(\frac{\alpha-\delta\gamma}{\delta}) M(t) + \alpha D^*] < 0$ (from $\alpha < \delta\gamma$) and δ small enough, even close to zero. In comparison, the third term is again small enough in magnitude, which follows from both ϵ and δ being small in value.

Thus, in the presence of anti-incumbency we get, $\frac{\partial \eta(t)}{\partial t} < 0$. The results in Propositions 7 and 8 can also be substantiated through numerical simulations, whose outcomes are discussed in the following section.

3.3.2.1 Numerical Simulations

Again, numerical simulations were carried out to find support for the level and change in the voting support, $M(t)$, and budgetary deficit, $D(t) - D^*$, over time in the presence of anti-incumbency. The following numerical parametric configurations capture the underlying notion of an opportunistic incumbent in the presence of anti-incumbency. We retain the values of all the parameters at the same level as in section

3.3.1.1, with the exception of the parameter γ , which is now assigned a high enough value to capture the notion of a large enough friction amongst the citizen voters that results in anti-incumbency (see Table 3.2). Specifically, the parameters now satisfy the restrictions stated in Propositions 7 and 8.

Table 3.2: Parametric Configurations in Case of Opportunist Incumbent and Present Anti-incumbency

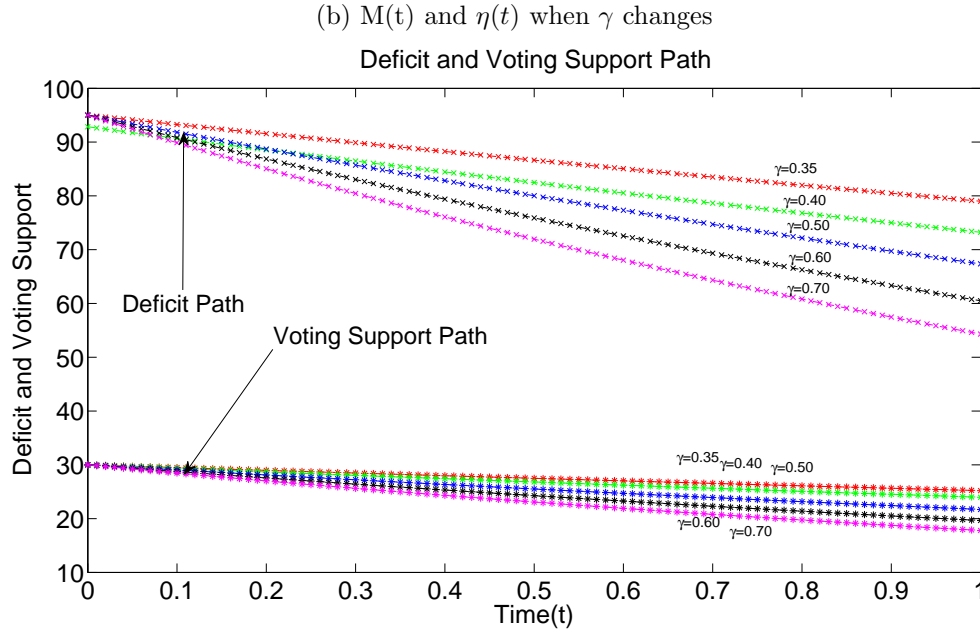
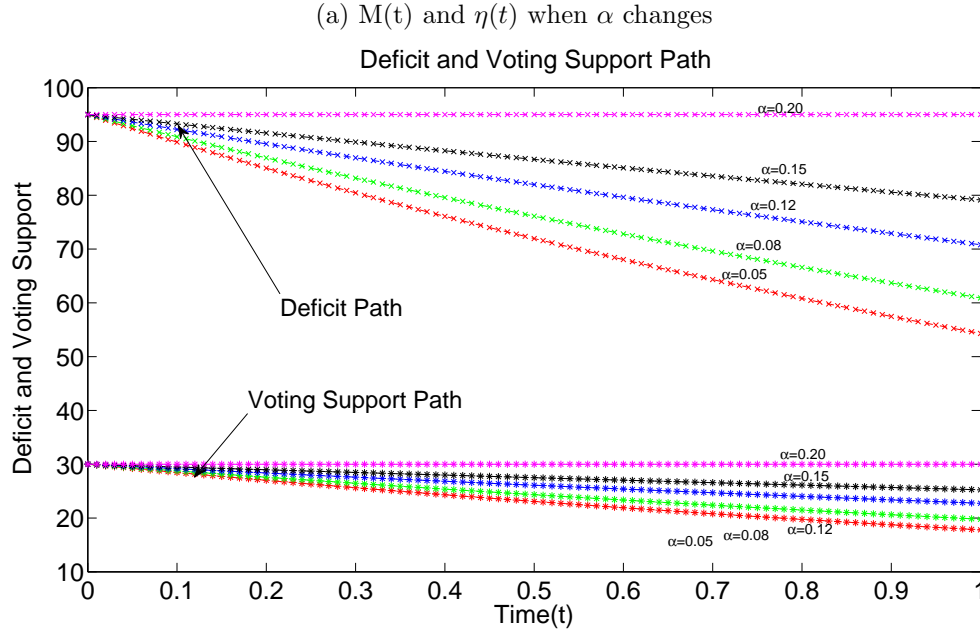
Name of the Parameters	Parameters	Change in Parameters Values	Fixed Parameters
Minimum Voting Support	M_0	-	30
Benchmark Deficit	D^*	-	5
Constant part of Shadow Value	K_M	-	20
Sensitivity of Deficit to Voting Support	α	0.05, 0.08, 0.12, 0.15, 0.20	$\gamma = 0.70, \delta = 0.3, \epsilon = 0.05, \rho = 0.02$
Friction Parameter Gamma	γ	0.35, 0.40, 0.50, 0.60, 0.70	$\alpha = 0.05, \delta = 0.3, \epsilon = 0.05, \rho = 0.02$
Weight to $D(t) - D^*$ versus $M(t)$	δ	0.10, 0.15, 0.25, 0.30, 0.45	$\alpha = 0.05, \gamma = 0.70, \epsilon = 0.05, \rho = 0.02$
Marginal Elasticity of Substitution	ϵ	0.01, 0.03, 0.05, 0.08, 0.12	$\alpha = 0.05, \gamma = 0.70, \delta = 0.3, \rho = 0.02$
Discount Factor	ρ	0.02, 0.03, 0.05, 0.08, 0.10	$\alpha = 0.05, \gamma = 0.70, \delta = 0.3, \epsilon = 0.05$

Table 3.2 reports the parameters for simulations, where the trends in voting support and deficit have been captured by assigning fixed values for some, whereas the other parameters are allowed to change. The fixed parameters are: $M_0 = 30$, $D^* = 5$ and $K_M = 20$. It is found that, for high enough initial level of voting support, M_0 , the time path of voting support and budgetary deficit will be positive. That M_0 is large is plausible as we are modeling the case of the incumbent politician. The results of all the five simulation runs, depicted in Figures 3.6 (3.6a and 3.6b) to 3.8, capture the comparative dynamics with respect to change in parameters α , γ , δ , ϵ and ρ . As explained in Propositions 7 and 8, both $M(t)$ and $\eta(t)$ are found to be continuously falling in the presence of the anti-incumbency. Comparing these with those in section 3.3.1.1, the only parametric configuration that is now changing is $\gamma > \alpha$. Here again, the time periods $t = 0$ and $T = 1$ respectively denote the year immediately after the last election and the year of next election. Further, it is easy to see that,

Proposition 9(s): *Under different numerical parametric configurations that satisfy the regularity condition in eq. (3.16), and considering the case of anti-incumbency, where $\alpha > \delta\gamma$, there is a continuous decline in voting support and budgetary deficit over time.*

In Figure 3.6 (3.6a), we depict the results of comparative dynamics with respect to

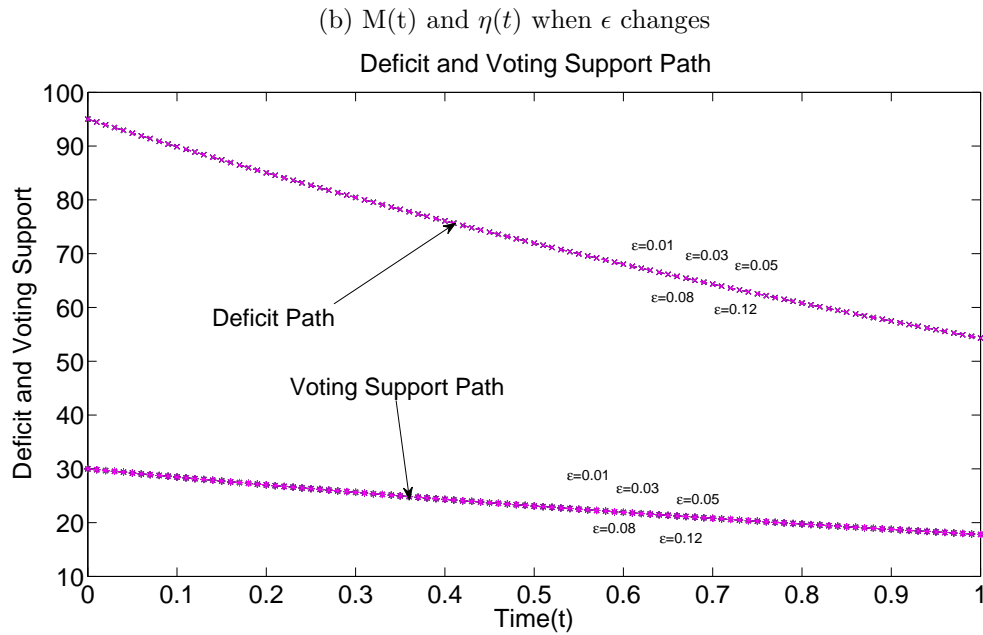
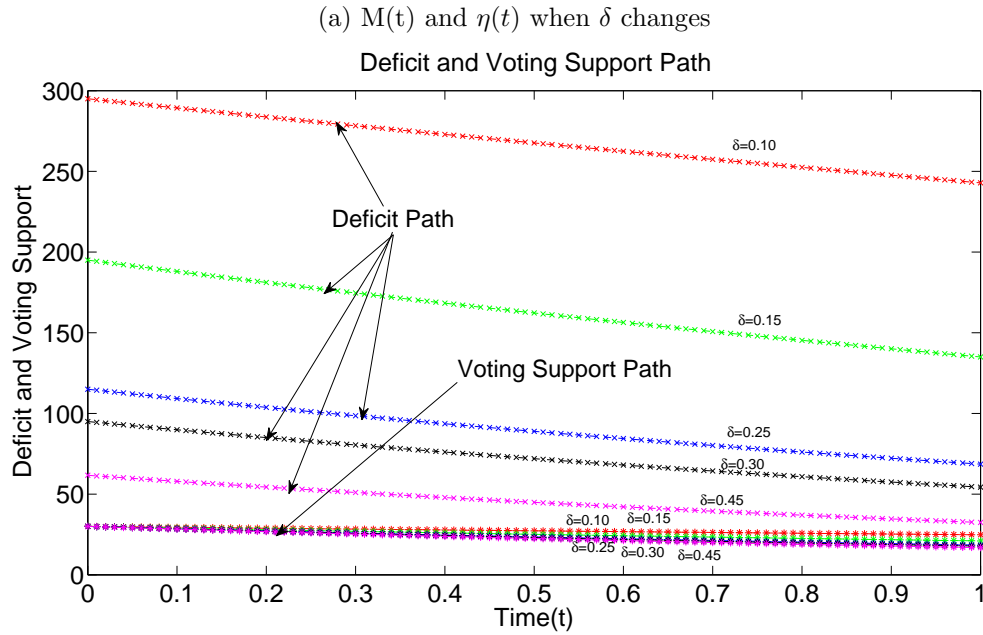
Figure 3.6: Time Path of Voting Support $M(t)$ and Fiscal Deficit $\eta(t)$ of the Opportunist Incumbent in the Presence of Anti-incumbency



Source: Author's calculations

a change in α , from $\alpha = 0.05$ to $\alpha = 0.08, 0.12, 0.15$, and 0.20 , while the values of the other parameters are assumed to be fixed at $\gamma = 0.70$, $\delta = 0.3$, $\epsilon = 0.05$ and $\rho = 0.02$. In Figure 3.6 (3.6b), the value of γ is changing according to $\gamma = 0.35, 0.40, 0.50, 0.60, 0.70$, with fixed values of $\alpha = 0.05$, $\delta = 0.3$, $\epsilon = 0.05$ and $\rho =$

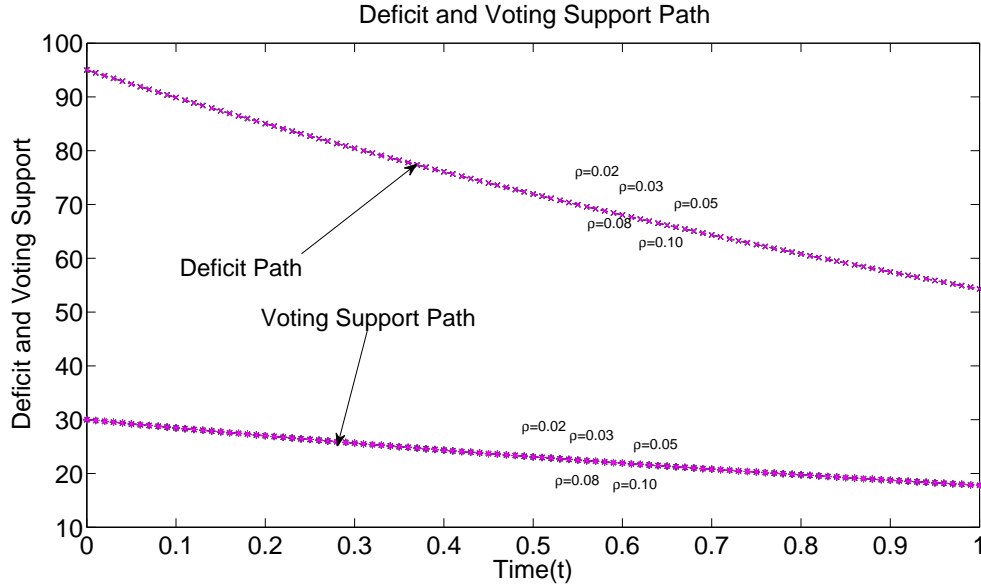
Figure 3.7: Time Path of Voting Support $M(t)$ and Fiscal Deficit $\eta(t)$ of the Opportunist Incumbent in the Presence of Anti-incumbency



Source: Author's calculations

0.02. Figure 3.6 (3.6a and 3.6b) trace a continuous decline in voting support and deficit over time. Additionally, Figure 3.7 (3.7a and 3.7b) capture the time path of voting support and deficit path with the respective changes in the parameters δ , from $\delta = 0.10, 0.15, 0.25, 0.30$ and $\delta = 0.45$, and ϵ according to $\epsilon = 0.01, 0.03, 0.05, 0.08$ and

Figure 3.8: Time Path of Voting Support $M(t)$ and Fiscal Deficit $\eta(t)$ of the Opportunist Incumbent when ρ changes in the Presence of Anti-incumbency



Source: Author's calculations

$\epsilon = 0.12$. With respect to the changes in δ and ϵ , the corresponding fixed values of other parameters are $\alpha = 0.05, \gamma = 0.70, \epsilon = 0.05$ and $\rho = 0.02$ in case of the former, and $\alpha = 0.05, \gamma = 0.70, \delta = 0.70$ and $\rho = 0.02$ in the latter case. Figure 3.8 captures the time path of voting support and deficit when the time preference parameter ρ is changing from $\rho = 0.02, 0.03, 0.05, 0.08$ and $\rho = 0.10$, while keeping the remaining parameters fixed as follows: $\alpha = 0.05, \gamma = 0.70, \delta = 0.3$ and $\epsilon = 0.05$. Notably, Figure 3.7a also depicts a falling trend in $\eta(t)$ and $M(t)$ over time. Further, although Figures 3.7b and 3.8 show a similar pattern of fall in the voting support path and deficit path as in the last three cases (3.6a, 3.6b and 3.7a), in both 3.7b and 3.8, the time paths of $M(t)$ and $\eta(t)$ are not varying with respect to the corresponding variation in the parametric configurations. This implies that, the time path of $M(t)$ and $\eta(t)$ are not very sensitive to the changes in the parametric configurations. Moreover, in all the five cases in the presence of anti-incumbency, the fall in deficit is faster than the fall in the voting support, as $t \rightarrow T$.

In the case of opportunism with no anti-incumbency, with $\alpha > \gamma$ such that $\alpha > \delta\gamma$, we found that the time path of $\eta(t)$ always lay above the corresponding path of $M(t)$.

Interestingly, this holds true even in the presence of anti-incumbency, where γ is high enough and $\alpha < \gamma$ such that $\alpha < \delta\gamma$. However, with anti-incumbency, the paths of both the deficit and the voting support are falling continuously, with the fall in the former sharper than the latter.

We next analyze the case of a partisan incumbent, who displays clear ideological preferences for specific economic policies, which is characterized using explicit preference parameters.

3.4 Partisan Government

Hibbs (1977) introduced the partisan behavior of the incumbent and Alesina (1987, 1988) incorporated rational expectations in the monetary approach of the political business cycle. Contrary to opportunistic behavior, the partisan incumbents have clear economic policy preferences or ideologies, such as left-wing parties may prefer higher employment and output growth even at the cost of tolerating higher inflation, while the right-wing parties might target lower inflation. We now model the possibility of partisan behavior of the incumbent, assuming perfect information. By this, we imply that the voters know the ideological bent of the incumbent and the actions that she/ he would take. In this case, to contain the extent of opportunistic behavior, the relative weight δ assigned to the deficit, $D(t) - D^*$, is assumed to be close to 1 (in the specific case that we consider, $\delta = 1$), as the partisan incumbent assigns almost equal weight to both voting support, $M(t)$, and budgetary deficit, $D(t) - D^*$. In addition, the partisan behavior may also be captured by a lower intertemporal elasticity of substitution (as the behavior of a partisan incumbent is more predictable and, thus, less variable over time) implied by a higher value of ϵ (which may be close to 1). To begin with, we discuss some analytical results for the partisan case.

3.4.1 Partisan Incumbent in the Absence of Anti-incumbency

The analysis in this part is analogous to the case of the opportunist incumbent in the absence of an anti-incumbency factor. Here, the only parameters that are changed are δ and ϵ . We consider higher values of δ and ϵ , even close to 1. However, we retain the assumption of $1 - \epsilon > 0$ for aggregate utility to be positive.

Proposition 10: *When $\alpha > \gamma$ such that $\alpha > \delta\gamma$, $0 < \rho < 1$, $\delta = 1$ and ϵ close to 1, the voting support, $M(t)$, and the level of budgetary deficit of the incumbent, $D(t) - D^*$, are both positive and continuously increasing over time.*

From an observation of the solutions in eqs. (3.10) and (3.12), and given the parametric restrictions for partisan behavior, the time paths of both $M(t)$ and $\eta(t)$ are positive and increasing up to the election period. For $M(t)$, this can be explained as follows. In view of $M_0 > 0$ and large, and $\alpha > \gamma$, it is implied that $\left(e^{\frac{\alpha-\delta\gamma}{\delta}t} - 1\right) > 0$. Thus, the first term in eq. (3.10), that is, $\Gamma_1 e^{\frac{\alpha-\delta\gamma}{\delta}t}$, will dominate the second term, Γ_2 . In the partisan case, the numerator and denominator of the ratio in square brackets in the third term of eq. (3.10), that is, $\left[\frac{e^{-\frac{\rho}{\epsilon}t} - e^{\frac{\epsilon-1}{\delta\epsilon}(\alpha-\delta\gamma)t}}{(\alpha-\delta\gamma) + \frac{\delta\rho}{\epsilon-1}}\right]$, will have the same sign (each will be negative in this case) and the ratio will always be positive. However, despite $\delta = 1$ and ϵ sufficiently large (even close to 1), the values of $e^{-\frac{\rho}{\epsilon}t}$ and $e^{\frac{\epsilon-1}{\delta\epsilon}(\alpha-\delta\gamma)t}$ will tend to be very small, as the the power of the exponential function is always negative, and the difference between the two exponential functions will also be rather small. Further, the value of $\frac{\epsilon-1}{\delta\epsilon}$ will be smaller than in the case of opportunism. However, using the same reasoning as in case of opportunism, Γ_3 and $e^{\frac{\alpha-\delta\gamma}{\delta\epsilon}(t-T)}$ will be very small, and although the latter term will be rising over time, it will only approach the value of 1 from below as $t \rightarrow T$. Thus, the entire third term will be dominated by the sum of the first two terms, and $M(t)$ will be positive in each time period. Moreover, following the reasoning for the opportunistic case and absent anti-incumbency, $M(t)$ will be rising over time.

We next turn our attention to budgetary deficit in eq. (3.12). We focus on the third term. From our earlier discussion, in the case of a partisan incumbent, we

have $\left[e^{-\frac{\rho}{\epsilon}t} - e^{\frac{\epsilon-1}{\delta\epsilon}(\alpha-\delta\gamma)t} \right] < 0$ that implies $\Gamma_4 < 0$. Further, with $\epsilon < 1$ (and close enough to 1), and $\delta = 1$, $\left[\frac{\alpha}{\delta} \left(e^{-\frac{\rho}{\epsilon}t} - e^{\frac{\epsilon-1}{\delta\epsilon}(\alpha-\delta\gamma)t} \right) - \frac{\epsilon-1}{\delta\epsilon} \Gamma_4 e^{-\frac{\rho}{\epsilon}t} \right] < 0$, and hence the ratio $\left[\frac{\frac{\alpha}{\delta} \left(e^{-\frac{\rho}{\epsilon}t} - e^{\frac{\epsilon-1}{\delta\epsilon}(\alpha-\delta\gamma)t} \right) - \frac{\epsilon-1}{\delta\epsilon} \Gamma_4 e^{-\frac{\rho}{\epsilon}t}}{\Gamma_4} \right] > 0$. Also, since the values of both δ and ϵ are higher in the case of the partisan incumbent than in the opportunist case, the denominator of the third term, $\frac{\epsilon-1}{\delta\epsilon}$, in eq. (3.12) will be small and negative. However, $e^{(\frac{\alpha-\delta\gamma}{\delta\epsilon})(t-T)}$ will be small, albeit increasing, only to approach the value 1 from below as $t \rightarrow T$. Consequently, the third term of eq. (3.12) is small and will be dominated by the first term. In fact, the first term will dominate both the second and the third terms. Thus, the $\eta(t)$ will be positive. Moreover, similar to the opportunistic case, this will also be rising over time.

The results of numerical simulations in Figure 5(a) and 5(b) support this claim. One can observe a continuous increase in voting support associated with an increase in the budgetary deficit over time as stated in Proposition 11(s),

Proposition 11(s): *For a wide range of parametric configurations, all of which satisfy the restrictions stated in Proposition 10, voting support, $M(t)$, and budgetary deficit, $D(t) - D^*$, of the incumbent will be continuously increasing over time.*

Table 3.3 contains the parameter values that have been used to simulate the time path of voting support and deficit paths, where fixed values have been assigned to some parameters, whereas other are changed to capture the comparative dynamics. The fixed parameters are the same as in the opportunistic case, namely, $M_0 = 30$, $D^* = 5$ and $K_M = 20$. It is found that, for a high enough initial level of voting support, M_0 , the time path of voting support and budgetary deficit will be positive and increasing over time. Table 3.3 summarizes these.

The five simulations that capture the change are with respect to changes in the following parameters: α , γ , δ , ϵ , and ρ , respectively. Figure 3.9 (3.9a) captures this when α changes from $\alpha = 0.05$ to $\alpha = 0.08, 0.12, 0.15$, and 0.20 , while the values of the other parameters are assumed to be fixed at $\gamma = 0.03$, $\delta = 1$, $\epsilon =$

Table 3.3: Parametric Configurations in Case of Partisan Incumbent and No Anti-incumbency

Name of the Parameters	Parameters	Change in Parameters Values	Fixed Parameters
Minimum Voting Support	M_0	-	30
Benchmark Deficit	D^*	-	5
Constant part of Shadow Value	K_M	-	20
Sensitivity of Deficit to Voting Support	α	0.05, 0.08, 0.12, 0.15, 0.25	$\gamma = 0.03, \delta = 1.00, \epsilon = 0.9, \rho = 0.02$
Friction Parameter Gamma	γ	0.001, 0.004, 0.008, 0.01, 0.03	$\alpha = 0.05, \delta = 1.00, \epsilon = 0.9, \rho = 0.02$
Weight to $D(t) - D^*$ verses $M(t)$	δ	0.80, 0.85, 0.90, 0.95, 1.00	$\alpha = 0.05, \gamma = 0.03, \epsilon = 0.9, \rho = 0.02$
Marginal Elasticity of Substitution	ϵ	0.85, 0.88, 0.92, 0.96, 0.99	$\alpha = 0.05, \gamma = 0.03, \delta = 1.00, \rho = 0.02$
Discount Factor	ρ	0.02, 0.03, 0.05, 0.08, 0.12	$\alpha = 0.05, \gamma = 0.03, \delta = 1.00, \epsilon = 0.9$

0.90 and $\rho = 0.02$. In Figure 3.9 (3.9b), the value of γ is changing according to $\gamma = 0.001, 0.004, 0.008, 0.01, 0.03$, with fixed values of $\alpha = 0.05$, $\delta = 1$, $\epsilon = 0.90$ and $\rho = 0.02$. Similarly, Figures 3.10 (3.10a and 3.10b) capture the time path of voting support and deficit path with the respective changes in the parameters δ from $\delta = 0.80, 0.85, 0.90, 0.95$ and $\delta = 1$ and ϵ as $\epsilon = 0.85, 0.88, 0.92, 0.96$ and $\epsilon = 0.99$. Corresponding to the change in δ and ϵ , the fixed parametric values are $\alpha = 0.05, \gamma = 0.03, \epsilon = 0.90$ and $\rho = 0.02$ in the former and $\alpha = 0.05, \gamma = 0.03, \delta = 1$ and $\rho = 0.02$ in the latter case. Figure 3.11 captures the time path of voting support and deficit when the time preference parameter ρ is changing from $\rho = 0.02, 0.03, 0.05, 0.08$ and $\rho = 0.10$, while keeping the remaining parameters fixed as $\alpha = 0.05, \gamma = 0.03, \delta = 1$ and $\epsilon = 0.90$.

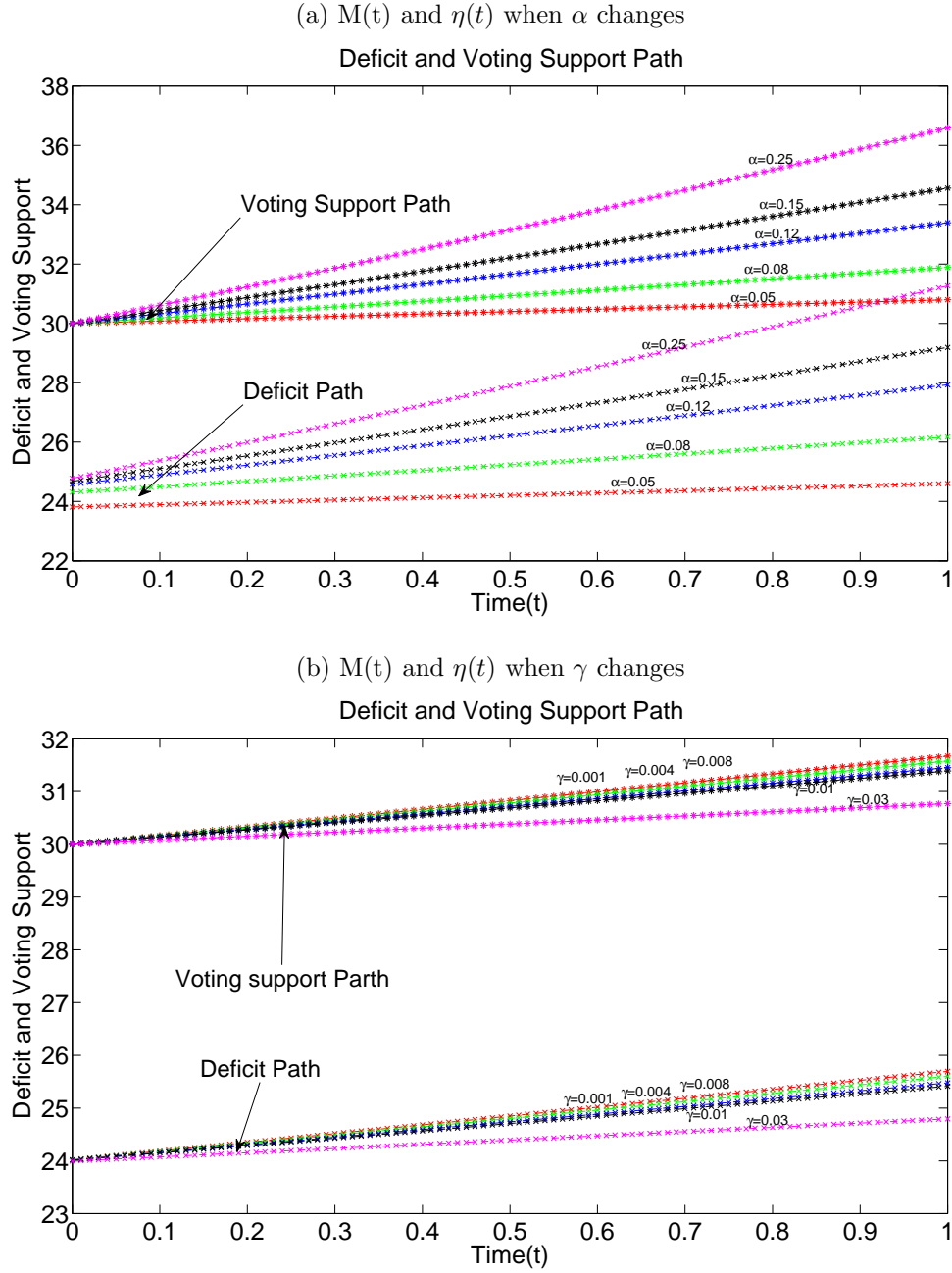
In case of all the five simulations, the positive and rising trend in $M(t)$ and $\eta(t)$ holds. However, unlike the opportunistic case, now the path of the budgetary deficit, $\eta(t)$, lies below the path of voting support, $M(t)$. This follows from the assumed value of δ being different in this case, which is explained below.

Proposition 12: *To garner an additional unit of voting support, $M(t)$, the change in the deviation of budgetary deficit from the benchmark will be equal to δ .*

From eq. (A.13) in the Appendix A, we have the equation

$$D(t) - D^* = \frac{1}{\delta} M(t) - \delta^{\frac{1-\epsilon}{\epsilon}} (\alpha Z_m)^{-\frac{1}{\epsilon}} e^{-\frac{\rho}{\epsilon} t + \frac{(\alpha - \delta \gamma)}{\delta \epsilon} (t - T)}. \quad (3.26)$$

Figure 3.9: Time Path of Voting Support $M(t)$ and Fiscal Deficit $\eta(t)$ of a Partisan Incumbent

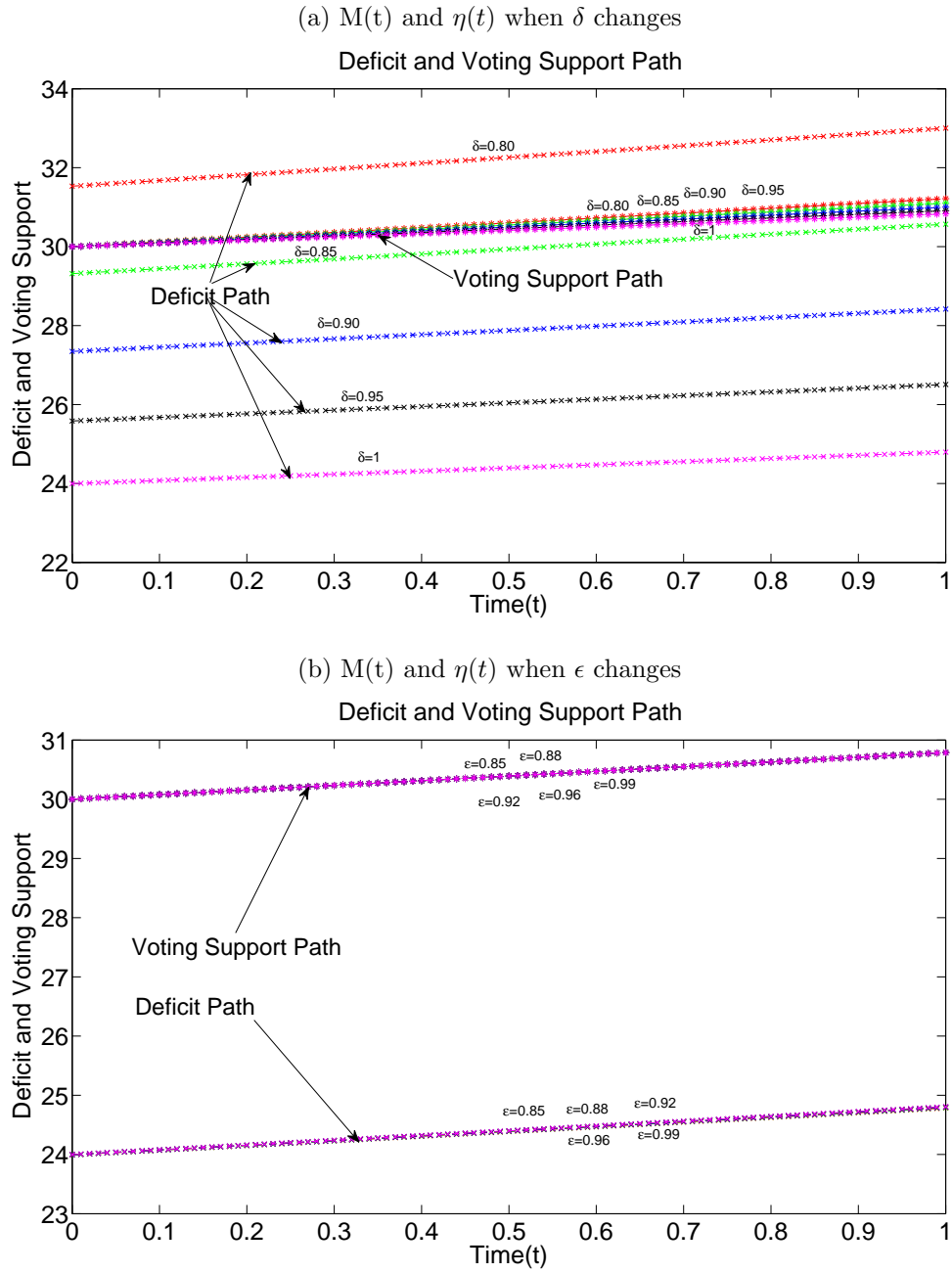


Source: Author's calculations

The above equation can be re-expressed as,

$$M(t) = \delta[D(t) - D^*] + \delta^{\frac{1}{\epsilon}} (\alpha Z_m)^{-\frac{1}{\epsilon}} e^{-\frac{\rho}{\epsilon} t + \frac{(\alpha - \delta \gamma)}{\delta \epsilon} (t - T)}. \quad (3.27)$$

Figure 3.10: Time Path of Voting Support $M(t)$ and Fiscal Deficit $\eta(t)$ of a Partisan Incumbent

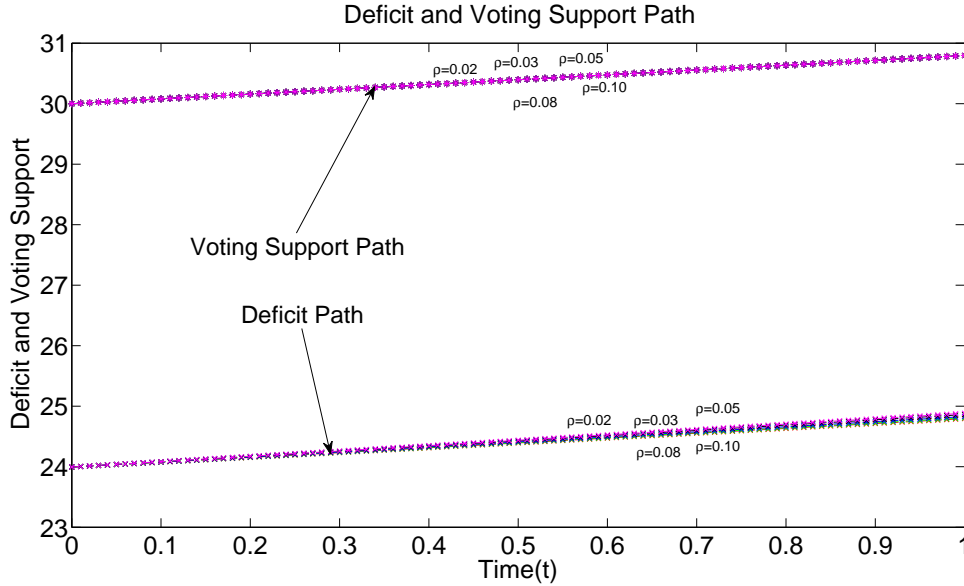


Source: Author's calculations

We find that the marginal change,

$$\frac{\partial M(t)}{\partial [D(t) - D^*]} = \delta. \quad (3.28)$$

Figure 3.11: Time Path of Voting Support $M(t)$ and Fiscal Deficit $\eta(t)$ of a Partisan Incumbent when ρ Changes



Source: Author's calculations

Since, in the opportunistic case, the value of δ is small (even close to zero), it implies that the additional voting support garnered due to an incremental increase in the deviation of budgetary spending from the benchmark (D^*) is very small (or even close to zero). Contrary to this, δ is large (even close to 1) in the case of a partisan incumbent, and, hence, the incumbent is able to derive a much larger voting support (even 1:1) with an additional unit increase in current deficit above the benchmark level, D^* . Thus, notably, the incumbent will have to manipulate the deficit much more to get a unit of additional voting support in the opportunistic case than in case of a partisan behavior. Hence, the opportunist incumbent may end up running a larger deficit close enough to the election as compared to the partisan.

Finally, given our modeling structure, and the definition of anti-incumbency, the case of anti-incumbency is not found consistent with the regularity condition for a partisan incumbent. Recall that, the regularity condition for the partisan incumbent is $1 - \epsilon < \frac{\rho\delta}{\alpha - \delta\gamma}$ (see eq. (3.17)). To characterize a partisan incumbent with anti-incumbency, we need to have $\alpha < \gamma$ such that $\alpha < \delta\gamma$, $\epsilon < 1$ (close to 1). This violates the regularity condition, $1 - \epsilon < \frac{\rho\delta}{\alpha - \delta\gamma}$, since $(1 - \epsilon) > 0$ and $\frac{\rho\delta}{\alpha - \delta\gamma} < 0$.

3.5 Conclusion

In an optimal control method, under the assumption of an iso-elastic kind of the net utility function from voting support vis-à-vis budgetary deficit, the opportunist and partisan cycles follow a similar time trend, although the former is found to be more pronounced than the latter. Moreover, the citizen voters provide support to both the kinds of incumbent politicians, but reject the same when there is the presence of a very strong anti-incumbency in the opportunistic case. Given a large enough initial level of voting support (that is plausible for the incumbent politician in office), the time paths of both voting support and deficit are found to be positive and rising in the case of absence of anti-incumbency. Moreover, to garner additional voting support, the opportunist incumbent has to incur an incrementally higher level of deficit as compared to the partisan incumbent. Thus, an opportunist incumbent mobilizes votes at a much higher cost of budgetary deficit to the economy than a partisan incumbent. While voting support is positive and increasing even in the partisan case, this case entails a lower cost in terms of budgetary deficit. Further, the time path of both voting support and deficit will be falling when anti-incumbency exists.

CHAPTER 4

Do Partisan and Opportunist Cycles Converge? An Empirical Evidence from India

4.1 Introduction

Historically, opportunism and partisaneering are two important political motivations that characterize the behavior of political parties and politicians. The political parties interested only in winning the election (office seekers) are opportunist whereas, if the parties are interested in executing specific policies (particular type of policy), then it is partisan behavior. [Alesina \(1988\)](#) and [Alesina, Cohen, and Roubini \(1993\)](#) classified the opportunistic and partisan politicians under non-rational behavior/ expectation and rational behavior/ expectations in [Table 4.1](#).

The opportunistic incumbent follows expansionary fiscal and monetary policy close to the election to portray the luminous picture of the government/ governance so as to attract larger share of the vote to win the election. This concept is famously known as a ‘political business cycle’, initially propounded by [Nordhaus \(1975\)](#). Initially, the concept of political business cycle was based on an opportunistic manipulation of the economic variables based on an exploitable Phillips curve where an incumbent attempts to create lower unemployment and higher output close to the election and thus increases its chances of winning the election. This very notion of opportunistic manipulation and creation of political business cycle was further popularized as political budget cycle (PBC) by [Rogoff and Sibert \(1988\)](#), [Rogoff \(1990\)](#), [Persson](#)

and Tabellini (2002, 2003), Drazen (2000), Shi and Svensson (2002b), Brender and Drazen (2005), Aidt, Veiga, and Veiga (2011) etc. The initial incarnations of the political business cycle models in 1970s were mainly based on the Phillips curve, in both opportunist and partisan models. Later, these included both, the monetary and fiscal policy variables in the objective function. The interaction of monetary and fiscal policy variables in the objective function popularized as the political budget cycles (PBC). The important nature of the PBC has been, while the incumbent that can influence the fiscal policy, the independent central bank (monetary authority) can be forced to accommodate the fiscal shocks. This concept is named as ‘active-fiscal, passive-monetary (AFPM)’ model of opportunist PBC (Drazen, 2000). This did not change the basic structure of the initial models, but is more powerful in explaining the concept which results in more pronounced budget cycles.

Table 4.1: Politico Economic Models of Business Cycles

Politicians’ Behavior	Non-rational Behavior and Non-rational Expectation	Rational Behavior and Rational Expectation
“Office Motivated” Politicians	Nordhaus (1975), Lindbeck (1976)	Cukierman and Meltzer (1986), Rogoff and Sibert (1988), Rogoff (1990), Persson and Tabellini (1990)
“Partisan” Politicians	Hibbs (1977, 1989)	Alesina (1987), Alesina and Sachs (1988)

Source: Alesina (1988) and Alesina, Cohen, and Roubini (1993)

The partisan motivation of an incumbent was based on the fixity of the economic policy based ideology in a particular way, for example, the left and the right-wing incumbents take different positions on economic policies and, hence, have different macroeconomic goals. The partisan political business cycle models was propounded by Hibbs (1977), Alesina (1987, 1988), Alesina and Sachs (1988), Faust and Irons (1999) etc. Out of these two behaviors, following questions are raised: Is there a clear line drawn between the two concepts, where one behaves opportunistically all the time and other as the partisan? Or, is it that partisan also behaves as an opportunist

close to the election? Is it that the opportunist can also behave like partisan if the country has dominance of partisan type parties or other way around? In fact, [Frey and Schneider \(1978a\)](#) find that the party behaves like an opportunist when it is in office and partisan otherwise. While closely looking at these questions, one can observe that the incumbent can camouflage itself in these two behaviors in such a way that the citizen voters could not identify the true face of the incumbent and can vote to the same incumbent again and again out of an illusion. While there might be different reasons and ways of convergence of the opportunism and partisaning, the question for which answer has been explicitly sought is whether there is convergence in these two behaviors of the incumbent. That is, whether the partisan and opportunist cycles move together?

Even though, these two concepts are distinctly defined, there is a possibility of intersection between the two. For example, partisan can implement its partisaning type policies close to the election and put the people in dilemma so that they could not understand the clear distinction between the two. For example, the American political system is ‘polarized’ into two parties - democrat and republican and each has a different economic policy stand. Empirically, the former is concerned more about unemployment, whereas the latter worries about inflation ([Alesina and Rosenthal, 1995](#)). If these preferred policies are expansionary close to the election, then convergence of opportunist and partisan behavior is inevitable. The difference in policy position creates political cycles, given that the notion of an exploitable Phillips curve holds. Similarly, [Hibbs \(1977\)](#) finds that right-wing parties concern more about inflation whereas left-wing worry more about unemployment. A polarized policy stand of the two parties can be the ideal position to be held by parties, but a less polarized policy stand by two parties is quite possible in case of political competition, particularly, close to the election. In fact, well prior to the election, stiff political competition can lead to similar (or near identical) political positions ([Alesina and Rosenthal, 2000](#)).¹ [Manjhi and Mehra \(2016\)](#) state that the opportunistic and parti-

¹This strategy is adopted to attract the largest share (median voters) of voters famously known as ‘median voter theorem’.

san cycles tend to follow a similar time pattern, where the cycle is more pronounced in case of the former well prior to the election. In addition, an opportunistic cycle is more costly for the economy as a whole even though it helps better in winning the election than otherwise. Thus partisan and opportunistic behavior could converge.

This chapter aims to exploring the behavior of the incumbent government in terms of how it uses different fiscal policy instruments during the electoral cycle? Is it that the incumbent adopts a uniform behavior during the electoral term? That is, whether the economic behavior of the political parties in an electoral term, in general, and election years versus non-election years, in particular, are different? The specific questions for which answers sought are - whether the incumbent's economic behavior with respect to fiscal deficit (gross fiscal deficit, primary deficits and revenue deficit), expenditure (aggregate expenditure, revenue expenditure, capital expenditure, social sector expenditure) and revenue (aggregate receipts, revenue receipts, capital receipts, tax revenue, non-tax revenue and sales tax) variables are consistent throughout the electoral term or does it change its motivation at different points in time? Some attempt has already been made to analyze the partisan and opportunistic cycles in case of Brazil. In fact, [Klein \(2014\)](#) confirms the simultaneous occurrence of opportunistic and partisan cycles in the municipality election of Brazil. We attempt to extend this basic idea of simultaneous occurrence of the partisan and opportunist cycles in case of India's parliamentary (union/ national) and assembly (state) elections. Since, we are interested in capturing the effects of different variables varying over time on fiscal variables (deficits, expenditure and revenue), we adopted the fixed effects OLS model and also controlled for the possible serial correlation and the heteroscedasticity.

Observing the possibility of convergence of the partisan and opportunistic behavior of the incumbents are not an easy task; just by knowing the economic behavior of the political parties. In reality, it is more sophisticated and beyond the economic policies. However, there are some noticeable facts which tell us that the political parties of different ideologue might not be binding to their ideology and closely follow their partisan behavior all the time. In fact, there are changes in the ideological

and partisan behavior in terms of economic policy perceived. Some of the important results our research derives are:

- The ideological differences and its reflection in India's economic policy are more visible at the national level elections and not at the state level ones. The opportunistic behavior of political parties are also more visible in the parliamentary elections and not in the assembly elections.
- There exists a strong PBC in all deficit heads, aggregate expenditure, aggregate revenue, revenue receipts, tax revenue and sales tax with respect to the union level of elections. However, except capital expenditure and sales tax none of the variables show significant PBC for the state level elections.
- Analyzing the union level election, approximated at state level, we find that the right-wing normally have higher deficit in all components compared to center-left government whereas, the year of the election deficits are lower under the right-wing and higher under the center-left governments.
- The center-left-wing expenditures are generally higher than the right-wing government. Similarly, the year of election expenditure of the center-left-wing government is significantly higher in the case of aggregate and capital expenditure whereas, revenue and social sector expenditure is opportunistically higher in case of right-wing government.
- Using the state level election and state level information, we find that the left-wing normally runs a higher deficits as compared to the right-wing and the centrist parties. The election year deficits are higher in gross fiscal deficit and primary deficit under the right-wing and primary deficit and revenue deficit under the centrist incumbent.
- At the state level, the left-wing parties generally spend lower as compared to the right and the centrist. The centrist spend more in all the four expenditure components namely, aggregate, revenue, capital and social sector expenditure whereas, right-wing spend more in aggregate, revenue and capital expenditure.

The revenue variables indicate that the left-wing incumbent normally generate less revenue as compared to the right and the centrist parties.

- At the union level election, there is center-left-wing partisan and opportunist convergence in all the deficits heads. There is strong center-left partisan and the opportunist government convergence in the aggregate expenditure and capital expenditure, whereas weak convergence of revenue expenditure in the case of the right-wing partisan and the opportunist government. Similarly, the center-left partisan behaviors converge with the opportunist government in the case of revenue receipts, tax revenue and non-tax revenue.
- At the state level, convergence is not very strong. That is, there is no convergence in opportunistic and partisan behavior of any party in deficits, whereas there is weak convergence in aggregate and revenue expenditure for the right-wing. Further, the right-wing opportunistic and partisan behaviors converge in the case of revenue receipts and tax revenue.
- For the union as well as the state level, in most of the cases, higher density of population shows higher deficit, expenditure as well as the revenue whereas, the GDP and GSDP growth rate (their lags) respectively show the lower deficit, expenditure and revenue. Similarly, in most of the cases, if the center and state has the same ruling party then it shows lower deficit, expenditure and revenue, this is true also in the case of the coalition government at the union and the state level.

The structure of the chapter is as follows: Section 4.2 briefs about the democratic institutions of India followed by data and estimation methods in Section 4.3. Section 4.4 analyzes the results for both the national and the state level elections and finally, Section 4.5 concludes the chapter.

4.2 Political Institutions in India

India has adopted an indirect parliamentary democratic system.² The parliamentary democratic system in India was established in 1950, when it became a republic for the first time after it got freedom from the British rule in 1947. India has one of the biggest democratic institutions in the world. The Indian democratic system has been of three tiers - (i) the union level (driven through the national level election, known as parliamentary election), (ii) state (conducts through the state level election, known as assembly elections) and (iii) local level administration is driven by municipal election (cities in the states) and village councils (group of villages) level elections. The union level parliamentary apex bodies such as the Lower House (Lok Sabha) and the Upper House (Rajya Sabha), are the highest entity of policy making at the union level.^{3, 4} The assembly (Vidhan Sabha) constituted at the state level whereas, municipality and village councils are respectively constituted at the district city/ urban areas and at the village level (formed by groups of villages also known as Village Panchayat/ Council). The Lok Sabha has 545 seats and that of the assembly has around 4120. The electoral verdict is decided over 543 contestations for the Lower House at the national level whereas, there are 4120 seats for the assembly at the state level. Of the total of 545 members in the Lower House, elected for a five year electoral term, 543 are elected through voting and the remaining 2 are directly appointed by the President of India from the Anglo-Indian community. There are 250 members in the Upper

²Controversy erupted during the constitutional debate that, whether India should adopt the concept of Gram Swaraj which Mahatma Gandhi has used as an instrument for village level mobilization to fight against the colonial power and also imagined as the institution for direct democracy of Panchayati Raj Institution (PRI) after independence or the indirect democratic government at the state and the national level. B. R. Ambedkar contested Gandhian idea of democratic institution by stating that the rural India is in the shackle of feudal elements and the upper castes and consequently the lower caste and the minorities will not get justice. Finally, the vision of centralized democratic system (which is derived from the Euro-American constitutional tradition) has been adopted in India. However, the Gandhian idea of Gram Swaraj in terms of PRI has been given space in Article 40(1) which reads as, ‘the state shall take steps to organize Village Panchayats and endow them with such power and authority as may be necessary to enable them to function as units of self-government (Venkatesu, 2016).’

³The Lok Sabha election is also known as national election or parliamentary election or the election at the union level where member of the parliament are elected through voting.

⁴nominated and appointed by the president of India from eminent personalities.

House, out of which 233 are chosen through the support voting by the members of the legislative assembly (MLA) from the state level, and the remaining 12 members are directly appointed by the President of India from the eminent personalities like - artists, authors, singers, sportsperson etc. The Upper House members are elected for a term of six years.

The distribution of the number of parliamentary Lower House seats has been done on the basis of state's population and only one is elected from each constituency to go to the parliament. Also, out of 545, 47 and 84 seats respectively are reserved for Scheduled Tribe and Scheduled Castes (under-privileged communities) as affirmative action. The remaining 412 seats are non-reserved and open for all the Indian citizens. The democratic representation by a candidate in a constituency is decided by the 'first-past-the-post' method.⁵ Once, the results are declared, the party with the highest elected members first claims to form the government. They also elect a party leader through majority's belief, who will head to become the Prime Minister to lead the country in policymaking and administration. As has happened on many occasions in India, if the elected members of a party are not sufficient enough to form the government, the party and individuals can form a coalition and choose the leader for the post of the Prime Minister. So far, after independence, India has witnessed 16 Lower House (Parliamentary/ Lok Sabha) elections.

In a similar institutional structure, different states and districts have a different number of assembly seats based on the population of the states and districts. Each constituency chooses one member to be sent to the assembly. As at the national level, the states also have reserved seats (affirmative measures) for Scheduled Caste and Scheduled Tribes based on their percentage of population in each state. The party with the highest number of seats won after the election can claim to form the government. If the number of seats is not reaching the majority threshold required to form the government, different parties and individual can form a coalition and choose the leader for the post of the Chief Minister to head the state in policy mak-

⁵This is a concept of one-citizen-one-vote to a candidate contesting the election in a particular constituency. A candidate with plurality of votes is the eventual winner of that constituency.

ing and administration. So far, India has had around 400 assembly elections since the beginning of the parliamentary democracy in India.

Third tier of the governance in Indian federal structure is local government (municipal/ village council). This has been brought into the Indian administrative structure recently in the 73rd and 74th amendments of the constitution of India in 1992. It gave the rural and urban local government a constitutional status. Historically, local level democratic (Panchayati Raj) institutions had existed in a different form even before British India, in different provinces, which were committed to dispense the public services as well as to provide justice. Today, India as the union of states, the sub-sub national (Panchayati Raj) democratic system has been set up in the form of municipal and village councils. There are around 25 million local governments in India, out of which around 3000 are in urban areas. Similarly, the urban local government consists of municipal corporations in big cities, municipalities in smaller cities and towns. The administrative set up in India is slightly different for 5th scheduled (main land partially excluded regions) and 6th scheduled (excluded areas of North-East region) areas. To administer and execute the policies at the local level in these areas, there are partially decentralized democratic provisions of self governing system in accordance with the Constitution of India. These are constituted to provide the basic rural/ urban services with little revenue and expenditure powers.

The union, the state and the local level of the administration are responsible for conducting fiscal policies related to expenditure and revenue collection. All three tiers of the government has individual as well as the shared responsibility of public expenditure and tax collection. In this chapter we focus on the aspects of the state level deficits, expenditure and revenue collection. Figures [B.1](#) and [B.2](#) (Appendix [B](#)) show the schematic structure of the state level expenditure and the revenue respectively. In figures, the variables that have been shaded in blue color are used in this chapter to analyze the opportunistic and partisan behavior of the government.

India has 29 states and 7 union territories. For the purpose of addressing the research questions, we consider the data for 16 major states for both the union/ national and

state level elections. The national level elections have been studied approximating the election results at the state level and also by using the state level information. For the state level analysis, all the information has been used from the state level itself. The method of estimation for both the national and state level elections is the same.

4.3 Data and Methodology

4.3.1 The Data and Variables

Our sample contains a balanced panel data set of the 16 states of India, excluding the newly born states such as Jharkhand, Chhattisgarh, Uttarakhand, Telangana, Union Territories and the states where elections did not take place regularly, such as, Arunachal Pradesh, Goa, Jammu and Kashmir. Similarly, except Assam, rests of the North-Eastern states are excluded from the sample due to incomplete information and irregular elections. We attempt to test the hypotheses of whether the opportunistic and partisan behavior in the fiscal policy of deficits, expenditure and revenue converge, using both the national and state level elections.

In case of India, there have been few attempt to study the behavior of the expenditure, revenue and deficits in the election and the non election years. The studies pertaining to expenditure are: [Chaudhuri and Dasgupta \(2006\)](#) find lower current account and higher capital expenditure in the year of state elections in India, expenditure targeted to small interest group in the year of election [Khemani \(2004\)](#), [Lalvani \(1999\)](#) state that the expenditure shifts to those items which attract larger votes and [Lalvani \(2008\)](#) finds that the state government spends higher on ‘desirable’ and ‘meritorious’ products such as primary education and agriculture and not on subsidies. Similarly, the studies related to revenue are: [B. B. Dash and Raja \(2014\)](#) finds lower tax collection in the year before the election whereas, [Chaudhuri and Dasgupta \(2006\)](#) finds lower commodity taxes in the year of election in India. Among the studies elsewhere, [Case \(1994\)](#) finds that the US governors running for re-election reduce

taxes, [Veiga and Veiga \(2007\)](#) find lower taxes in the year of Portuguese municipality elections etc. For 19 OECD countries [Katsimi and Sarantides \(2012\)](#), and for 10 Canadian provinces [Kneebone and McKenzie \(2001\)](#) find lower revenue collection in the year of election.

The budget deficit/ surplus are the consequences of the pattern of the expenditure and revenue. There are no any specific studies which directly focus on the budget deficits in India. However, the higher expenditure and lower taxes in the year of election is the logical proceed to study the politics of budget deficit. The economists most of the time have argued in favor of fiscal discipline of balanced budget, particularly, after the Great Depression. In contrary, last 30-40 years have witnessed a higher deficit among large number of advanced economies (refer [Figure 3.1](#) for the analysis of budget of the world economy in 2010 and 2011) which is also being followed by developing countries recently. There might be many reasons of higher fiscal deficits such as Keynesian idea of counter cyclical fiscal policy, role of interest groups, inter-generational re-distribution etc. However, one cannot deny the political motivations of the government where she/ he can manipulate the fiscal policy in the presence of non-rational voters with ‘fiscal illusion’ ([Alesina and Perotti, 1995b](#)).

The detailed data and definitions of the variables related to expenditure and revenue are provided in [Appendix B](#). However, the fiscal variables for which the convergence is going to be investigated are⁶:

- Fiscal deficits: gross fiscal deficit, primary deficit and revenue deficits.
- Public expenditure: aggregate expenditure, revenue expenditure, capital expenditure, and social sector expenditure.
- Revenue: aggregate revenue, revenue receipts, capital receipts, tax revenue, non-tax revenue, and sales tax.

⁶To normalize the fiscal variables considered for the analysis, it has been taken as the ratio of state level nominal state domestic product

Table 4.2: Political and Economic Ideological Classification of the Political Parties

Abbreviation	Party Name	Political Ideology	Ideological Stand	Scale
AIADMK	All India Anna Dravid Munnetra Kazhagam	Social Democratic, Populist	Center	3
AGP	Assam Gana Parishad	Populist, Economic Liberalism	Right-Center	2
BJD	Biju Janata Dal	Populist, Economic Liberalism	Right-Center	2
BJP	Bhartiya Janata Party(BJP)	Economic Liberalism	Right	1
BSP	Bahujan Samaj Party	Dalit Socialism, Socialism	Left-Center	4
CPI	Communist Party of India	Communism	Left	5
CPI(M)	Communist Party of India (Marxist)	Communism	Left	5
DMK	Dravid Munnetra Kazhagam	Social Democratic, Populist	Center	3
HVP	Haryana Vikas Party	Social Democratic, Populist	Center	3
INC	Indian National Congress (INC)	Democratic Socialism, Social Democracy	Center	3
INLD	Indian National Lok Dal	Populist Economic Liberalism	Right-Center	2
JD	Janata Dal	Populist Economic Liberalism	Right-Center	2
JD(S)	Janata Dal (Secular)	Populism, Social Democracy	Center	3
JD(U)	Janata Dal (United)	Integral Humanism, Conservatism	Right-Center	2
JP	Janata Party	Populist, Economic Liberalism	Right-Center	2
LDF	Left Democratic Front	Communism	Left	5
LF	Left Front	Communism	Left	5
LKDP	Lok Dal	Populist, Economic Liberalism	Right-Center	2
NCP	Nationalism Congress Party	Democratic Socialism, Populist	Center	3
RJD	Rashtriya Janata Dal	Democratic Socialism, Populist	Center	3
SAD	Shiromani Akali Dal	Populist, Economic Liberalism, (Sikhism)	Right-Center	2
SHS	Shiv Sena	Economic Liberalism	Right	1
SP	Samajwadi Party	Populist, Democratic Socialism	Center	3
TDP	Telugu Desam Party	Regionalist, Fiscally Conservative	Right	1
UDF	United Democratic Front	Populist, Democratic	Center	3

Source: B. B. Dash and Raja (2012), Note: President Rule has '0' ideological scale. Author classification has added for AGP and LKDP.

Further, Table 4.2 shows the ideological leaning of the political parties, which has been derived based on their belief and the orientation toward the economic policies (following, B. B. Dash and Raja, 2012). The ideological classification has been divided into five scales as: 1, 2, 3, 4 and 5, where these are respectively right, right-center, center, center-left and left. The independent India has been largely ruled by the centrist parties, both at the national and state levels. In fact, at the union level, the ideological classification is easier, as it has mostly been ruled either by the center-left (also known as the Indian National Congress (INC) or an ally led by it, called United Progressive Alliance (UPA)), or the right-wing party (also known as the Bharatiya Janata Party (BJP) or an ally led by it, called National Democratic Alliance (NDA)).^{7,8} So, in this case we have a binary classification for the national level analysis. However, we consider three basic ideological classification - left, right and center for the state level elections.

The basic question for which answer is sought in this chapter is whether the party with different ideologies with different policy preferences, and the parties having no policy preference at all converge in the election years and the non-election years in terms of their fiscal policy position? Generally, the left or center-left government is concerned more about the unemployment (Hibbs, 1977; Alesina, 1988) and hence deficit and expenditure under this government can be higher. Similarly, these parties also care for the poor and working class of the society and consequently cannot burden with a heavy tax on them. Also, since the total population is dominated by lower and lower middle income group in a developing country like India, and indirect tax is a component which affects the mass; there is a possibility of lower indirect taxes in general in the electoral term, and year of the election in particular. Also, the prevalence of lion's share of indirect tax in the total pool of revenue, reduction in

⁷The UPA is a coalition formed by centrist and left parties of India after 2004 election when none of an individual party crossed the threshold of majority. However, Indian National Congress (Congress) has the largest share in the coalition and hence led the alliance. Over time, there are many entry and exit but there are approximately 10 parties in the coalition.

⁸NDA has been formed by right-wing parties including some centrist parties. At the time of formation after 1998 parliamentary election, there were around 13 parties and currently there are 47 parties.

the indirect tax will in general, lower the total revenue of the states in the electoral term, and in the year of the election, in particular under the left-wing government. The process of higher expenditure and lower taxes can be persistent throughout the electoral term or the partisan motivation of the left government can be executed in the year of election.

With respect to the considered fiscal variables and the partisan behavior of the government the basic statements of the hypotheses are:

- Fiscal deficits are higher in the year of elections and there is a convergence in opportunism and left-wing partisan behavior of deficits.
- Public expenditures are higher close to the elections and there is a convergence in opportunism and left-wing partisan behavior of expenditure.
- Revenue expenditures are lower in the year of the elections and there is a convergence in opportunism and left-wing partisan behavior.

The other variables that have been incorporated in the analysis are: GDP growth rates, density of the population, dummy for the coalition government (as in [Dutta, 1996](#) and [Lalvani, 2005](#)), same party government at the center and the states or the state ruling parties are allied to the center, and the number of years party in power. These are explained in detail in next section with respect to the union and the state level elections.

4.3.2 Method of Estimation

The empirical method for estimation is similar to [Klein \(2014\)](#), [Veiga and Veiga \(2007\)](#) and [Sakurai and Menezes-Filho \(2011\)](#). The specific analysis to find answers to the following questions: first, whether the incumbent uses the fiscal policy opportunistically? Second, whether ideologically different parties exhibit different economic policy positions (partisan) in an electoral term, in general, and year of the election, in particular? Third, whether economically different positioned parties display dif-

ferentiated behavior during the election years? In addition to these, we also seek to analyze how demographic and economic variables affect the dependent fiscal variables in the following equation. The basic structure of the estimable equation is as follows:

$$B_{it} = \alpha + \beta Elect_{it} + \delta Pi_{it} + \gamma Elect * Pi_{it} + \lambda M_{it} + \phi N_{it} + \mu_t + \eta_i + v_{it}. \quad (4.1)$$

where, B_{it} refers to fiscal (deficits, expenditures and revenue and their components) variables for i^{th} state, at time t . Here, the number of cross-sectional units is 16, that is, $i = 1, 2, \dots, 16$ for B_{it} = fiscal deficits (gross fiscal deficits, revenue deficits and primary deficit), expenditures (aggregate expenditure, revenue expenditure, capital expenditures, and social sector expenditure) and revenue (aggregate revenue, revenue receipts, capital receipts, tax revenue, non-tax revenue, and sales tax) and time $t=1980-81$ to $2010-11$. The vector $Elect$ represents the year of election dummy, which assumes value equal to 1 in the election years and 0 otherwise.

The vector, Pi , represents political ideology, which is center-left or right in case of national level election and, left, center and right in case of the state elections. It is generally believed that fiscal deficit is higher under the left-wing government than the alternative types of governments, because the former concerned more about the reduction in unemployment (Hibbs, 1977; Alesina, 1988). An attempt to reduce the unemployment requires higher expenditure and, hence, larger deficits. Imbeau and Pétry (2004) and Cusack (1999) find that fiscal deficit is higher under the right-wing government whereas an opposite result has been found by Roesel (2016). Consequently, we do not assume any prior for Pi with respect to deficit, expenditure and revenue variables. The vector $Elect*Pi$ is the interaction term of the political ideology and the election years. The interaction term measures the opportunistic behavior of an ideology based differentiated parties, which is again a matter of investigation, and we do not have any prior for that. The vector M consists of demographic and economic variables namely - population density (*Density*) and GDP growth rate (nominal *GDP* growth rates for all India level and nominal *GSDP* growth rate for the state level). The high density populated states incur higher expenditure and also impose more

fiscal burden to collect more revenue to enhance economic activities of the states. Hence, the expected sign for the coefficient for *Density* is positive (Holcombe and Williams, 2008; Ladd, 1992). The high expenditure and revenue make the budget deficit/ surplus inconclusive and, hence, the expected sign of the fiscal deficit is ambiguous in nature. Most of the studies look at the causality (and hence the relation) from deficit/ expenditure/ revenue on the GDP growth rate, but since we are interested in capturing the effect of GDP growth rate on various fiscal components, we will analyze the converse. In case of India, the relationship between GDP growth rate and fiscal components is rather very contentious. For example, Bhoir and Dayre (2015) do not find a significant relationship between fiscal deficit and economic growth whereas, Ramu and Gayithri (2016) show an adverse impact of fiscal deficit on GDP growth. Khundrakpam (2003) and R. K. Dash and Sharma (2008) find that public expenditure positively explain to the national income in the long run whereas, excess of expenditure has adverse effect on it. Mallick (2008) finds that, it is not the aggregate and capital expenditure, but revenue expenditure that has a positive impact on economic growth rate. He also finds that, taxes positively affect the output growth rate. Hence, we do not have any priors for the effect of GDP growth rate and its lag on the fiscal variables. The vector N consists of the remaining electoral and non economic factors such as - *Allied* and the coalition government *Cldum*. Separate explanations for these variables have been provided below. We do not assume any prior in the case of *Allied* and *Cldum*. The time and year effects have respectively been captured by μ_t and η_i , and v_{it} is the random variable assumed to have $E(v_{it}) = 0$.

At the national level, for a majority of the years, India has been ruled by two parties - the INC/ Congress and BJP where the former can be considered as the ideologue of - populist, democratic socialism, social democracy (idea of centrist party), whereas the latter follows economic liberalism (idea of right-wing). Hence, these are assigned to the categories of centrist (center-left) and the right-wing respectively at the national level. That is, *center-left*=1, if the union is led by the Congress (or its coalition, UPA) government, 0 otherwise. Similarly, *right*=1, if the country is led by the BJP (or its coalition, NDA), 0 otherwise. In this case, the vector *Elect* is the year of the

parliamentary election (*Yr_electn*), where the dummy takes the value 1 in the year of election and 0 otherwise. Similarly, the vector P_{it} is a political ideology takes value 1 if it's a right-wing government in power and 0, otherwise. The vector M consist of population density (*Density*) and GDP growth rate (*gdpgi*), where the growth rate of the national GDP has been approximated at the state level, which is state invariant. The vector N consist of *Allied* and *Cldum* where, *Allied* = 1 if, the state and center have the same ruling party or state is a part of center's coalition of the union government and 0 otherwise. The variable, *Cldum*=1 if the central government is a coalition and 0 otherwise.

For the state level analysis as well, we have used similar variables, except the growth rate of GDP, ideology and coalition binary. That is, in case of the assembly election, the growth rate of the nominal GSDP (*gsdp-g*) has been used, and it is state and time variant. The vector P_i of the ideological positions consist of - *left*, *right* and *center* (Table 4.1) for the analytical purpose of this chapter. A separate binary variable has been created for each, such as dummy=1 if *right*, 0 otherwise, dummy=1 if *left*, 0 otherwise and dummy=1 if *center*, 0 otherwise. Additionally, the year of assembly (state) elections (*Yr_elects*) could be different for the states, where *Yr_elects*=1 if it is the year of the assembly election, 0 otherwise. Further, we use the variable allied (*Allied*)=1 if the state has the same government as union, 0 otherwise and the coalition binary *Cldum*=1 if the state government is coalition, 0 otherwise. Finally, we have also used the population density (*Density*) in the equation as the demographic variable.

Since, we are interested in capturing the effect of variables that vary over time, a fixed effects ordinary least squares (OLS) model has been used to estimate eq. (4.1). In fact, the state level unobserved characteristics, such as culture, religion, caste, gender, genetical inheritance etc., can affect the predictors or predicted variables, and the correlation between the unobserved characteristics of the states and predictors cannot be zero. Accordingly, to nullify, the time invariant features, the fixed effects model is more useful than alternative. Thus, the model captures the time invariant

individual characteristics and, hence, the estimated coefficients are unbiased in this fixed effects model. For the estimation of the regression we have captured both the state and time fixed effects. For the national level analysis, since the day of election, GDP growth rate (*gdpgr*) and coalition binary (*Cldum*) are common for all the states (variables are state invariant), we have used a time trend to capture these effects and not the time fixed effect. However, for the state level analysis, all the variables are state variant and accordingly, we have used both, the state and time fixed effects.

4.4 Results

The analysis of the results covers two aspects: descriptive statistics and regression estimates. The first subsection provides the results pertaining to the descriptive statistics, followed by those of the regression analysis.

4.4.1 Basic Results: Descriptive Statistics

To capture the opportunistic behavior of the government, the data series have been calculated in a deviation form for each year, where the opportunistic deviation is equal to the reference year value minus the average of the values in the electoral term.⁹ The opportunistic manipulation is defined as the deviation of the year before or year of the election value minus the average of the values over the entire electoral term (for more detail refer to [Manjhi and Mehra, 2017](#)).¹⁰ For our purpose, the year of the election (and not the year before the election) has been considered to capture the opportunistic manipulations.

Tables 4.3 and 4.4 respectively present the basic statistics for the opportunistic deviation/ manipulations of fiscal variables for the union of India and the states. These

⁹*Opportunistic Deviation* = $[B_{ts} - Mean(B_s)]$, where B_{ts} is the reference year value for a particular year t in the electoral term s and $Mean(B_s)$ is the mean of all the values in that electoral term s . The calculation of the mean of B_s excludes the reference year t^{th} value. Also, if the electoral term is not complete then, we consider next electoral term including the incomplete period as well.

¹⁰*Opportunistic Manipulation* = $[B_{yts} - Mean(B_s)]$, where s is an electoral term and yt is the year before or year of the election value.

statistics contain the average of an opportunistic behavior of the government in an electoral term as well as in the election year for the right-wing and center-left governments at the national level, and for the right-wing, right-center, center, left-center and left-wing governments at the state level. As can be inferred from Table 4.3, for gross fiscal deficit as a ratio of GSDP, the average opportunistic manipulations during the election years are found to be more in case of both right-wing and the center-left governments as compared to the other years of the electoral term. Similarly, the revenue deficits and primary deficits depict similar results as the gross fiscal deficits.

Table 4.3: Opportunistic Deviation/ Manipulations with Respect to the Parliamentary Election

Fiscal Variables/ Ideologies	Right		Otherwise/ Centre Left		
	Term Mean	Yr_Elect Mean	Term Mean	Yr_Elect Mean	
Fiscal Balance	Fiscal Deficit	0.579	0.888	-0.165	-0.094
	Primary Deficit	0.524	0.764	-0.149	-0.070
	Revenue Deficit	0.650	0.970	-0.137	0.088
Expenditure	Aggregate Expenditure	0.180	0.451	-0.048	0.313
	Revenue Expenditure	0.448	0.505	-0.087	-0.158
	Capital Expenditure	-2.208	0.756	-1.781	4.479
	Social Expenditure	0.278	0.354	-0.119	-0.202
Revenue Receipts	Aggregate Receipts	0.036	0.289	-0.065	-0.001
	Revenue Receipts	-0.202	-0.468	0.051	-0.246
	Capital Receipts	-2.208	0.756	-1.881	4.331
	Tax Revenue	-0.117	-0.266	0.022	-0.144
	Non-Tax Revenue	-0.085	-0.202	0.029	-0.102
	Sales Tax	-0.031	-0.038	-0.029	-0.035
	Own Tax Revenue	-0.032	-0.052	-0.002	-0.115
	Own Non-tax Revenue	-0.064	-0.074	0.035	0.062
	Own Revenue	-0.096	-0.126	0.033	-0.053
Others	Growth Rate of GDP	10.467	13.315	15.293	15.284
	Inflation	4.801	4.609	7.818	8.613

Source: Author's calculations, T Mean: Term Mean, and YE_Mean: Year of Election Mean

The higher deficits in the year of election are the opportunistic behavior, which we find more in case of the right-wing government at the center. However, the higher deficits in the election years and hence the opportunistic behavior can be because of high expenditure relative to revenue or lower revenue relative to expenditure or

both. So, certain expenditure (revenue) items (if not all) are tend to exhibit a larger (lower) deviation in the year of the election. In fact, except revenue expenditure and social sector expenditure in the case of the center-left/ otherwise governments, the remaining expenditure variables display higher levels under right-wing as well as alternative governments in the year of election. The capital expenditure exhibits the highest opportunism for the alternative governments as compared to the right-wing one. Clearly, capital expenditure is one of the most visible fiscal component in the economy, which tend to attract a higher number of voters. Hence, spending more on visible public good through capital expenditure close to the election is rewarded (Rogoff, 1990; Aidt, Veiga, and Veiga, 2011).

The revenues during the election years are opportunistically lower for most of its components except aggregate revenue in the case of right-wing, and, for alternative governments, aggregate revenue, capital receipts and own non-tax revenue tend to be lower. The tax and non-tax revenues are the items that show a positive deviation in the electoral term and a negative one in the year of election, pointing toward opportunistic behavior. A lower sales tax in the year of election in the case of both the right-wing and the alternative governments indicates that the incumbents would try not to disappoint the voters with higher indirect taxes.

Among the major macroeconomic variables, the union level nominal GDP growth and inflation rates are respectively higher in the year of election under the right-wing and the center-left government. Assuming Okun's law holds (lower unemployment rate associated with higher output growth), this also confirm the results by Alesina (1987) and Alesina and Rosenthal (1995), where authors argue that the left-wing parties worry more about the unemployment and the right-wing parties worry for the inflation. There is no significant difference in the electoral term and the year of election inflation rate under right-wing government and nominal GDP growth rates under the center-left-wing government. Moreover, in general in the electoral term as well as in the year of the election, both the nominal GDP growth rate and the inflation rate are found to be higher under the center-left-wing governments.

Table 4.4: Opportunistic Deviation/ Manipulations with Respect to the Assembly Election

Fiscal Variables/ Ideologies	Right		Right-Center		Center		Left-Center		Left		
	T Mean	YE_Mean	T Mean	YE_Mean	T Mean	YE_Mean	T Mean	YE_Mean	T Mean	YE_Mean	
Fiscal Balance	Fiscal Deficit	0.067	0.173	0.030	-0.107	-0.088	-0.037	-0.196	-0.293	0.012	0.146
	Primary Deficit	0.081	0.150	-0.016	-0.127	-0.081	-0.057	0.164	0.334	0.025	-0.001
	Revenue Deficit	0.028	0.225	-0.012	0.050	-0.076	0.123	-0.792	-1.645	0.003	0.315
Expenditure	Aggregate Expenditure	0.494	-0.514	0.081	-0.361	0.113	-0.103	-0.877	-1.230	0.028	-0.547
	Revenue Expenditure	0.133	-0.321	0.137	0.282	0.066	0.149	-0.331	-1.149	0.048	0.029
	Capital Expenditure	0.815	6.426	-0.762	2.034	-0.775	4.054	-6.036	17.484	0.066	4.050
	Social Expenditure	0.099	-0.063	0.161	0.279	0.001	0.058	0.482	1.039	0.028	-0.138
Revenue Receipts	Aggregate Receipts	0.531	-0.404	-0.050	-0.218	0.165	0.250	-1.398	-2.427	0.001	-0.676
	Revenue Receipts	0.105	-0.546	0.149	0.232	0.141	0.026	0.461	0.496	0.046	-0.286
	Capital Receipts	0.870	6.606	-0.657	2.469	-0.910	4.184	-6.036	17.484	0.089	4.418
	Tax Revenue	0.078	-0.211	0.091	0.389	0.000	-0.055	0.132	0.672	0.036	-0.087
	Non-Tax Revenue	0.028	-0.335	0.058	-0.157	0.142	0.080	0.330	-0.176	0.010	-0.200
	Sales Tax	0.035	0.058	0.032	0.121	-0.016	0.005	-0.020	0.112	0.017	-0.007
	Own Tax Revenue	0.056	-0.061	0.066	0.200	-0.015	-0.126	-0.035	-0.022	0.027	-0.078
	Own Non-tax Revenue	0.032	-0.093	-0.027	-0.303	0.058	-0.096	0.113	-0.179	0.038	-0.193
Own Revenue	0.088	-0.154	0.039	-0.103	0.043	-0.222	0.078	-0.200	0.064	-0.271	
Others	Growth Rate of GSDP	15.094	18.013	14.966	12.703	14.335	15.505	11.694	16.511	13.603	13.636
	Inflation	6.126	7.960	7.909	7.718	7.661	9.039	6.401	9.969	6.559	7.206

Source: Author's calculations, T Mean: Term Mean, and YE_Mean: Year of Election Mean

Table 4.4 presents the state level results for the opportunistic behavior of the governments with respect to different fiscal variables. As can be seen, budget deficit is higher during the election in all the cases: right, center and left-wing governments, except in the case of primary deficit under the left-wing government. The deficits can be ascribed either to a higher expenditure or a lower revenue receipts or both. The year of election expenditure on revenue, capital and social sector is higher under the centrist government but this is lower in the aggregate expenditure. Surprisingly, the aggregate expenditure is lower in the year of assembly election as compared to the electoral term average for all the ideological categories of parties. This implies that the expenditures are targeted more to the year of national level elections and not the state level elections. The capital expenditure close to the election depicts a similar behavior in the case of the parliamentary election. That is, the most common opportunism across the party line is, the capital expenditure is higher in the year of election for all types of governments. In fact, the centrist parties are more opportunist compared to the rest in terms of aggregate expenditure, even though their election year expenditure is less than the term average. The social sector expenditure in the year of election is higher compared to the term average for centrist parties. However, the electoral term average social expenditure of the left and the right-wing parties are higher. Thus, the center most parties are more opportunist in social sector expenditure compared to the left and the right-wing parties.

For the revenue and its components, the left-wing, right-wing and the centrist governments are more opportunist with respect to revenue receipts, tax revenue, non-tax revenue, own tax revenue, own non-tax revenue and own revenue, because they do tend to opportunistically derive less revenues in the year of election. That is, to generate greater voting support, governments intend to collect lower tax receipts in the year of election. The aggregate revenue is lower in the case of both left and right-wing governments in the year of the election, whereas, this is not the case for a centrist government. In fact, sales tax is lower during the year of election under the left government, whereas, it is higher in the case of a right-wing and centrist governments during the election years.

Further, in the year of election, both inflation as well as the growth rates of GSDP is higher under all the regimes of the government, except the right-center. However, the term average of the GSDP growth rate under the right-wing government is higher compared to the centrist and the left-wing government. The electoral term average inflation is lower under the right-wing government compared to the centrist and the left-wing governments. Thus, at the state level the right-wing government is better able to maintain lower inflation and higher nominal GSDP growth rate as compared to the left and the centrist parties in the electoral term.

4.4.1.1 Opportunism Synthesis

In response to the union level elections, both the right and center-left parties are found to display opportunism, but this is the case more so for the former in terms of manipulating the fiscal policy, and hence incurs a higher deficit close to the election. Also, the right-wing is opportunist in all the expenditure components considered: aggregate, revenue expenditure, capital and social expenditure. The center-left party is more opportunist in the case of aggregate and capital expenditures. Conversely, the right-wing is more opportunist as compared to the center-left government in case of revenue expenditure and social sector expenditure. Similarly, right-wing is more opportunist in revenue receipts, tax revenue, non-tax revenue, sales tax, own tax revenue, own non-tax revenue and own revenue. A similar pattern of opportunism has been noticed with the center-left parties, except in the case of own non-tax revenue. Comparing both, the right and the center-left-wing parties with respect to the revenue items, we find that the right-wing is more opportunist than center-left in revenue receipts, tax revenue, non-tax revenue, sales tax, own non-tax revenue and own revenue. The growth rate of the national level nominal GDP and inflation rate is higher (It implies that a higher GDP growth rate is associated with higher inflation.) under the center-left government, in both the electoral term and the year of the election, than the right-wing.

The state level analysis suggests that the right and the centrist parties are more

opportunists in case of the gross fiscal deficit, primary deficit and the revenue deficit whereas, left-wing is opportunist in the gross fiscal and revenue deficits. Among all, right-wing is more opportunist in comparison with the remaining two ideological parties. In terms of the expenditure variables, the right-wing and the left-wing are both opportunist only in capital expenditure whereas, except in case of the aggregate expenditure, the centrist government is opportunist in all the expenditure variables. Also, among all, centrist parties are more opportunist as compared to the rest in terms of revenue expenditure and social sector expenditure. The right-wing capital expenditure in the year of the election is higher than for the remaining two party types. Further, the revenue receipts, tax revenue, non-tax revenue, own tax revenue, own non-tax revenue and own revenues are opportunistically lower in the year of election under all the three different political regimes. Also, in terms of generating revenue, the left parties opportunistically contribute less in the year of the election than the other parties. The aggregate revenue and sales tax is opportunistically lower under the left-wing government as compared to the right and the centrist governments. Also, notice that the year of the election GSDP growth rate and inflation is higher under all three different governments. Interestingly, the GSDP growth rate in the year of the election as well as in the electoral term is higher under the right-wing government as compared to the other two types.

To trace the fiscal policy of the different ruling parties having differing ideological positions, an empirical estimation is now attempted. We now analyze the results of the national and state level elections in the following section.

4.4.2 Regression Results

The descriptive empirical results point toward the possibility of convergence of policies for partisan and opportunistic behavior of parties at the union and the state level election cycles. The empirical strategy of OLS yields the following results for the union and the state level elections.

4.4.2.1 Convergence in the National Level Elections

Table 4.5, 4.6 and 4.7 present the results for deficit, expenditure and revenue items to check for the possibility of convergence of the economic policy based partisan and opportunistic behavior of the political parities at the national level. These tables compile the result of the behavior of right-wing and center-left-wing governments in India in the parliamentary elections.

Table 4.5 presents the result for the deficit variables, such as the gross fiscal deficit, primary deficit and revenue deficit. Notice that, the election year gross fiscal deficit, primary and revenue deficits are positive and highly significant. Specifically, the year of parliamentary election gross fiscal deficit, primary deficit and the revenue deficit respectively are 0.59%-0.66%, 0.56%-0.63% and 0.69%-0.72% higher than the non-election year levels. In general, the higher gross fiscal deficit can either be because of high primary deficit or high revenue deficit or both. The primary deficit implies the difference between the current expenses of the government on goods and services and current revenue from all kinds of taxes net of transfers. Since, spending more on the goods and services and imposing lower taxes in the year of election is beneficial for the opportunist government to attract larger voting support, she/ he does so and, hence, creates a larger primary deficit in the year of the election.

Similarly, revenue deficit is defined as the difference between the actual net expenditure and the projected net expenditure. Since, the year of election revenue deficit is significantly higher, the government has the tendency to incur higher revenue expenditure, which is actually the case though not significant (refer to Table 4.6), to make the voters happier in the year of election. In contrast, the government has the tendency to reduce taxes in the year of election as voters might go unhappy and vote against the government. That is, for an opportunist government, there is a tendency for actual expenditure (receipts) to be higher (lower) than the projected in the year of election. The two major sources of revenue receipts are tax-revenue (further classified as direct and indirect taxes) and non-tax revenue (major sources are: net contribu-

tion of Public Sector Undertakings (PSUs), interest payments, social and community services and economics services), and in fact, both of these components report lower levels in the year of election and, accordingly, revenue receipts also show lower and significant levels in the year of election (analyzed in Table 4.7).

The year of the parliamentary election is state invariant, and so far, the union government has been ruled either by a center-left government or a right-wing government. The dummy for political ideology has been defined as $P_i=1$ if the incumbent is of right-wing type and 0 otherwise (center-left government at the union level). In this case there exists an exact negative correlation between these binary components and, hence, there is the problem of multicollinearity; but the results for both have been reported for the purpose of analysis. Further, Table 4.5 presents that the right-wing government run higher deficits in the electoral term relative to the center-left. In fact, the center-left government incur significantly lower deficit in the year of the election. In contrast, in the year of the election, right-wing maintains a lower deficits and the center-left the higher deficit in all the components, though these are not significant. Notice that, opportunism and center-left partisan cycles weakly (cycles exist but not significant) converge in all the deficit components, whereas, the right-wing maintains its partisan behavior of higher deficit in the electoral term and reduces it in the year of the election.

The respective demographic and economic variables are population density, GDP growth rates and its lag values. The higher density states report higher deficit when variable time trend is controlled though, it is significant only in the case of gross fiscal deficit. Higher GDP growth rates in the current and past year reduce the deficits though not significant. The last sets of regressors are the dummies for the alliance and the coalition variables. Generally, in the electoral term, if there is the same ruling party at the union and the state level (or, state is an ally of the union government) then it displays a lower deficit; however, this is not significant. Moreover, the coalition union government runs a lower deficits but significant only in the case of primary deficit and revenue deficit. The negative and significant time trend in the

Table 4.5: Parliamentary (National) Elections: Deficit Variables

Variables	Fiscal Deficit		Primary Deficits		Revenue Deficits	
	I	II	III	IV	V	VI
<i>Yr_Electn</i>	0.613 (0.108)***	0.573 (0.102)***	0.595 (0.109)***	0.558 (0.102)***	0.657 (0.091)***	0.635 (0.087)***
<i>Right</i>	2.213 (0.487)***	1.999 (0.452)***	1.895 (0.490)***	1.690 (0.542)***	2.575 (0.488)***	2.455 (0.500)***
<i>Centre_Left</i>	-2.213 (0.487)***	-1.999 (0.452)***	-1.894 (0.490)***	-1.690 (0.451)***	-2.574 (0.487)***	-2.455 (0.487)***
<i>Elect_r</i>	-0.283 (0.359)	-0.265 (0.350)	-0.036 (0.366)	-0.019 (0.362)	-0.229 (0.368)	-0.219 (0.369)
<i>Elect_cl</i>	-0.283 (0.359)	0.265 (0.350)	0.036 (0.366)	0.019 (0.361)	0.229 (0.367)	0.219 (0.368)
<i>Density</i>	-0.001 (0.002)	0.007 (0.003)**	-0.003 (0.001)*	0.004 (0.003)	-0.004 (0.003)	0.0004 (0.004)
<i>Gdpgi</i>	-0.037 (0.023)	-0.024 (0.024)	-0.003 (0.022)	0.008 (0.024)	-0.010 (0.032)	-0.003 (0.031)
<i>Gdpgi(-1)</i>	-0.0001 (0.042)	-0.061 (0.041)	0.079 (0.042)	0.021 (0.037)	-0.051 (0.038)	-0.085 (0.039)**
<i>Allied</i>	-0.029 (0.154)	-0.061 (0.097)	-0.002 (0.156)	-0.032 (0.125)	0.075 (0.190)	0.057 (0.154)
<i>Cldum</i>	-0.671 (0.357)*	0.365 (0.443)	-1.594 (0.318)	-0.600 (0.326)*	1.173 (0.563)**	1.750 (0.751)***
<i>Trend</i>	—	-0.122 (0.028)***	—	-0.117 (0.031)***	—	-0.068 (0.027)**
<i>Constant</i>	4.990 (1.300)***	3.641 (1.298)**	2.343 (1.159)*	1.050 (1.205)	2.055 (1.279)	1.304 (1.428)
<i>Right=Centre-left</i> [F-Test(.)]	20.62 (0.000)***	19.54 (0.000)***	14.93 (0.001)***	14.00 (0.002)***	27.86 (0.0001)***	24.08 (0.0002)***
<i>Elect_r=Elect_cl</i> [F-Test(.)]	0.62 (0.442)	0.57 (0.460)	0.010 (0.922)*	0.000 (0.958)	0.39 (0.541)	0.35 (0.560)
R^2	0.187	0.046	0.176	0.099	0.152	0.404
<i>F - Stat</i>	39.16 (0.000)***	38.11 (0.000)***	27.99 (0.000)***	27.82 (0.000)***	39.01 (0.000)***	35.70 (0.000)***
<i>Obs.</i>	480	480	480	480	480	480
<i>State Fixed Effects</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>

***, **, * Significant at 1%, 5% and 10% respectively (standard errors in parentheses)

P-values are in parentheses in case of F-Statistics

result implies that the governments are committed to lower deficit overtime.

It is interesting to note from Table 4.5 that the right and center-left-wing governments at the union level are significantly different from each other during the electoral term, where the former maintains higher deficits and latter run lower deficits. However, the year of election behavior of the right and the center-left parties are not very different

from each other. Accordingly, in terms of controlling the fiscal deficit, the right and the center-left, in general, do not converge in the electoral term, whereas, in the year of election right-wing maintains lower deficit and the center-left has higher deficit though, in these cases results are insignificant. In the case of the fiscal policy of deficit we find that there is weak convergence in the opportunistic behavior of the government and the partisan behavior of the center-left. The weak convergence can also be traced from the Figures B.3 and B.4 (B.4a and B.4b) where the right-wing partisan (red colored)¹¹ and center-left partisan (blue colored)¹² mostly move together in the year of election and diverge rest of the time. There is an occasional convergence of the center-left partisan with the opportunistic behavior of the government (dark colored).¹³ The model provides a good fit as the F-statistics is significant for all the models estimated.

Since, gross fiscal deficit is the difference between aggregate expenditure and aggregate revenue, a higher deficit close to the election will be either due to higher expenditure or lower receipts or both in the year of election. Table 4.6 presents the result for the expenditure items, namely, aggregate expenditure, revenue expenditure, capital expenditure and social sector expenditure. As expected, expenditure in the year of the election is higher in all the cases except the social sector expenditure but, significant only in the case of aggregate expenditures. The right-wing government generally spends lower in all the components of expenditure, in fact, significantly lower in case of capital and social sector expenditure. In contrary, the center-left government generally spends higher in all the expenditure components but significant only in the case of capital and social sector expenditure. The center-left government is more opportunist than the right-wing in the case of aggregate and capital expenditure as it spends more on these heads in the year of election than during the electoral term, whereas, the opportunistic social sector expenditure by the right-wing is higher and significant. The center-left government exhibits a lower social sector expenditure in

¹¹the red colored lines are the right-wing partisan behavior of the government in Appendix B.

¹²the blue colored lines are the center-left partisan behavior of the government in Appendix B.

¹³thick dark colored lines capture the opportunistic behavior of the government in Appendix B.

the year of the election. There is strong center-left partisan and the opportunist government convergence in the aggregate expenditure and capital expenditure, whereas weak convergence of revenue expenditure in the case of the right-wing partisan and the opportunist government. The opportunistic and partisan cycles are also shown in Figures B.5 (B.5a and B.5b) for aggregate and revenue expenditure and Figures B.6 (B.6a and B.6b) for capital and social sector expenditure.

Table 4.6: Parliamentary (National) Elections: Expenditure Variables

Variables	Aggregate Expenditure		Revenue Expenditure		Capital Expenditure		Social Expenditure	
	I	II	III	IV	V	VI	VII	VIII
<i>Yr_Electn</i>	1.164 (0.405)**	1.061 (0.381)**	0.275 (0.181)	0.190 (0.177)	1.490 (1.695)	2.335 (1.866)	0.016 (0.102)	-0.026 (0.103)
<i>Right</i>	0.061 (0.618)	-0.496 (0.606)	0.332 (0.424)	-0.125 (0.403)	-19.168 (2.795)***	-14.610 (2.399)***	-0.689 (0.290)**	-0.921 (0.291)***
<i>Center_Left</i>	-0.061 (0.618)	0.496 (0.606)	-0.332 (0.424)	0.124 (0.403)	19.168 (2.79)***	14.610 (2.399)***	0.689 (0.290)**	0.921 (0.291)***
<i>Elect_r</i>	-1.344 (0.393)***	-1.297 (0.381)***	0.049 (0.352)	0.088 (0.364)	-3.924 (2.097)*	-4.311 (2.245)*	0.955 (0.242)***	0.975 (0.256)***
<i>Elect_cl</i>	1.344 (0.393)***	1.297 (0.381)***	-0.049 (0.352)	-0.088 (0.364)	3.925 (2.097)*	4.311 (2.245)*	-0.955 (0.241)***	-0.975 (0.256)***
<i>Density</i>	0.007 (0.007)	0.029 (0.009)***	0.004 (0.005)	0.022 (0.003)***	0.247 (0.039)***	0.068 (0.035)*	0.003 (0.004)	0.012 (0.004)***
<i>Gdpgi</i>	-0.124 (0.038)***	-0.091 (0.035)**	-0.080 (0.029)**	-0.053 (0.027)*	0.110 (0.103)	-0.157 (0.115)	-0.058 (0.019)***	-0.044 (0.018)**
<i>Gdpgi(-1)</i>	-0.089 (0.071)	-0.249 (0.080)***	-0.059 (0.051)	-0.190 (0.043)***	-0.668 (0.221)***	0.635 (0.362)*	-0.017 (0.042)	-0.083 (0.037)**
<i>Allied</i>	-0.861 (0.390)**	-0.945 (0.392)**	-0.592 (0.333)*	-0.660 (0.272)**	-4.438 (2.940)	-3.754 (1.982)*	-0.390 (0.187)**	-0.425 (0.175)**
<i>Cldum</i>	-2.581 (0.676)***	0.125 (0.720)	-0.317 (0.567)	1.900 (0.460)***	-3.580 (3.364)	-25.704 (3.930)***	-0.825 (0.389)**	0.300 (0.200)
<i>Trend</i>	—	-0.319 (0.091)**	—	-0.261 (0.043)***	—	2.610 (0.465)***	—	-1.33 (0.035)***
<i>Constant</i>	22.834 (3.464)***	19.313 (2.077)***	16.779 (2.321)***	13.895 (1.291)***	-64.57 (17.38)***	-35.803 (12.77)**	8.014 (1.882)***	6.549 (1.455)***
<i>Right=Centre-left</i> [F-Test(.)]	0.010 (0.922)	0.670 (0.426)	0.610 (0.446)	0.10 (0.761)	47.01 (0.000)***	37.07 (0.000)***	5.620 (0.032)**	9.98 (0.006)***
<i>Elect_r=Elect_cl</i> [F-Test(.)]	11.64 (0.004)***	11.53 (0.004)***	0.020 (0.889)	0.060 (0.811)	3.500 (0.081)*	3.690 (0.074)*	15.63 (0.001)***	14.46 (0.002)***
<i>R²</i>	0.017	0.038	0.013	0.027	0.027	0.257	0.010	0.016
<i>F – Stat</i>	8.67 (0.000)***	12.14 (0.000)***	10.69 (0.000)***	22.12 (0.000)***	82.78 (0.000)***	173.99 (0.000)***	5.160 (0.003)***	5.88 (0.001)***
<i>Obs.</i>	480	480	480	480	480	480	480	480
<i>State Fixed Effects</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>

***, **, * Significant at 1%, 5% and 10% respectively (standard errors in parentheses)

P-values are in parentheses in case of F-Statistics

The demographic and economic variables are found to be significant explanatory variables. That is, the coefficient of density of population is positive and significant in all respect of all the expenditure heads considered. It implies that a higher density state spends more. However, higher GDP growth and its lag do not enhance the expenditure. Further, if the union and the states have the same ruling party or the

state ruling party is an ally, the different expenditure variables are found to be lower. Similarly, if the union government is a coalition government, the expenditure incurred is lower in case of capital expenditure but higher in the case of aggregate, revenue and social sector expenditures. The time trend variable captures the time effect where, over time, expenditure is increasing in capital expenditure, but there is a reduction in aggregate, revenue and social sector expenditures.

Generally, there is a significant difference in capital and social sector expenditures between right and center-left-wing governments, but there is no difference in terms of aggregate and revenue expenditure. Further, in the year of the election, there is a significant difference between the right and center-left governments in all but revenue expenditure.

The counter part of the expenditure is revenues. Table 4.7 presents the result for revenue variables namely, aggregate receipts, revenue receipts, capital receipts, tax revenue, non-tax revenue and sales tax. The year of the election receipts are positive in case of aggregate revenue, capital receipts and sales tax, whereas there are lower revenue receipts, tax revenue and non-tax revenues. In fact, tax revenues (direct and indirect tax) and non-tax revenues are more sensitive in affecting voters sentiments as tax revenues directly affect the tax payers (and, hence, the voter) in terms of direct and indirect taxes. Some of the non-tax revenues include net contribution of Public Sector Undertakings (PSUs) such as: forests, power projects, road and water transport Services, irrigation projects, economic services, and interest payments etc. In general, the government cannot afford to disappoint the consumers of power and irrigation etc., in the year of the election.

It is found that the right-wing government significantly receives less revenues from all the revenue heads, whereas, the center-left government receives positive and significant revenues in all the respect of revenue items. Further, in the year of the election, the right-wing government receives lower revenue in aggregate, capital receipts and sales tax but significant only in the case of last two revenue heads. For the remaining revenue heads, such as revenue receipts, tax revenue and non-tax revenue are

higher in the year of election under the right-wing government but not significant. The center-left-wing government derives higher aggregate receipts, capital receipts and sales tax in the year of election and lower revenue receipts, tax revenue and non-tax revenue. However, there is center-left partisan behavior convergence with the opportunist government in revenue receipts, tax revenue and non-tax revenue. The right-wing partisan does not converge in any of the revenue head. The opportunistic and partisan cycles are also shown in Figure B.7 (B.7a and B.7b) for aggregate revenue and revenue receipts, in Figure B.8 (B.8a and B.8b) for capital receipts and tax revenue and in Figure B.9 (B.9a and B.9b) for non-tax revenue and sales tax.

With regard to the demographic and economic variable, it is found that a higher population density state normally has higher revenue collection, whereas, a higher current GDP growth and previous year's growth not really contributing toward higher revenue collection. The states and the union having the same ruling party or a coalition government at the center also do not enhance revenue collection. The time trend variable shows that capital receipts and sales tax increase over time, whereas, aggregate receipts, revenue receipts, tax and non-tax revenue fall. Notably, there is a significant difference in the policy of revenue collection of the right and the center-left governments in the electoral term, whereas, right and the center-left parties are not very different from each other in the year of the election in terms of revenue receipts, tax revenue and non-tax revenue. The models provide a good fit as the F-statistics are found to be highly significant.

The basic results in the case of the union election is that there is center-left-wing partisan and opportunist convergence in all the deficits heads. There is strong center-left partisan and the opportunist government convergence in the aggregate expenditure and capital expenditure, whereas, weak convergence of revenue expenditure in the case of the right-wing partisan and the opportunist government. Similarly, the center-left partisan behavior converges with the opportunist government in the case of revenue receipts, tax revenue and non-tax revenue.

Table 4.7: Parliamentary (National) Elections: Revenue Variables

Variables	Aggregate Receipts		Revenue Receipts		Capital Receipts		Tax Revenue		Non-tax Revenue		Sales Tax	
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
<i>Yr_Electn</i>	0.844 (0.429)*	0.738 (0.414)*	-0.381 (0.138)**	-0.444 (0.134)***	1.694 (1.699)	2.539 (1.864)	-0.213 (0.085)**	-0.244 (0.087)**	-0.168 (0.107)	-0.200 (0.106)	0.046 (0.019)	.048 (0.018)**
<i>Right</i>	-1.301 (0.658)*	-1.871 (0.685)**	-2.243 (0.671)***	-2.580 (0.698)***	-19.779 (2.737)***	-15.220 (2.350)***	-.953 (0.418)**	-1.117 (0.426)**	-1.289 (0.360)***	-1.464 (0.374)***	-0.303 (0.090)***	-0.290 (0.078)***
<i>Center_left</i>	1.302 (0.658)*	1.871 (0.685)**	2.242 (0.670)***	2.581 (0.698)***	19.779 (2.737)***	15.220 (2.350)**	0.952 (0.418)**	1.117 (0.426)**	1.289 (0.360)***	1.463 (0.374)***	0.303 (0.090)***	0.290 (0.078)***
<i>Elect_r</i>	-0.456 (0.655)	-0.408 (0.653)	0.279 (0.519)	0.308 (0.533)	-3.718 (2.101)*	-4.105 (2.239)*	0.025 (0.503)	0.038 (0.512)	0.254 (0.222)	0.269 (0.218)	-0.167 (0.078)**	-0.168 (0.077)**
<i>Elect_cl</i>	0.456 (0.655)	0.408 (0.653)	-0.279 (0.519)	-0.308 (0.533)	3.718 (2.101)*	4.105 (2.239)	-0.025 (0.503)	-0.038 (0.512)	-0.254 (0.222)	-0.269 (0.218)	0.167 (0.078)**	0.168 (0.077)**
<i>Density</i>	0.006 (0.008)	0.028 (0.006)***	0.008 (0.007)	0.022 (0.008)**	0.246 (0.039)***	0.067 (0.036)*	0.009 (0.006)	0.015 (0.007)**	-0.0002 (0.003)	0.007 (0.004)	0.0001 (0.001)	-0.0003 (0.002)
<i>Gdpgi</i>	-0.200 (0.064)***	-0.167 (0.059)**	-0.069 (0.027)**	-0.049 (0.022)**	0.133 (0.109)	-0.134 (0.119)	-0.035 (0.015)**	-0.025 (0.015)*	-0.034 (0.022)	-0.024 (0.020)	-0.021 (0.006)***	-0.022 (0.006)***
<i>Gdpgi(-1)</i>	-0.203 (0.050)***	-0.366 (0.055)***	-0.008 (0.055)	-0.105 (0.047)**	-0.784 (0.229)***	0.519 (0.367)	-0.0002 (0.040)	-0.047 (0.037)	-0.008 (0.033)	-0.058 (0.027)**	-0.030 (0.010)***	-0.027 (0.009)**
<i>Allied</i>	-0.731 (0.413)*	-0.816 (0.414)*	-0.667 (0.282)**	-0.718 (0.289)**	-4.627 (2.942)	-3.943 (2.004)*	-0.803 (0.214)***	-0.827 (0.218)***	0.135 (0.130)	0.109 (0.135)	-0.072 (0.075)	-0.071 (0.074)
<i>Cldum</i>	-1.741 (0.763)**	1.023 (0.659)	-1.490 (0.931)	0.149 (0.562)	-2.968 (3.532)	-25.097 (3.945)***	-0.814 (0.550)	-0.018 (0.446)	-0.676 (0.676)	0.167 (0.517)	0.139 (0.142)	0.079 (0.174)
<i>Trend</i>	-	-0.326 (0.074)***	-	-0.193 (0.061)***	-	2.611 (0.468)***	-	-0.093 (0.049)*	-	-0.099 (0.025)***	-	0.007 (0.019)
<i>Constant</i>	25.658 (3.223)***	22.061 (1.881)***	14.724 (2.777)***	12.591 (2.284)***	-63.17 (17.427)***	-34.38 (12.39)**	8.144 (2.444)***	7.108 (2.349)***	6.580 (0.830)***	5.483 (0.800)***	4.488 (0.536)***	4.566 (0.558)***
<i>Right=Centre-left</i> [F-Test(.)]	3.91 (0.066)*	7.45 (0.015)**	11.17 (0.004)***	13.63 (0.002)***	52.20 (0.000)***	41.92 (0.000)***	5.18 (0.038)**	6.87 (0.019)**	12.80 (0.003)***	15.26 (0.001)***	11.29 (0.004)	13.69 (0.002)
<i>Elect_r=Elect_cl</i> [F-Test(.)]	0.49 (0.496)	0.390 (0.541)***	0.290 (0.598)	0.330 (0.572)	3.13 (0.097)*	3.36 (0.086)*	0.00 (0.960)	0.010 (0.940)	1.31 (0.270)	1.52 (0.236)	4.51 (0.050)**	4.68 (0.047)**
<i>R²</i>	0.014	0.039	0.031	0.054	0.028	0.266	0.044	0.035	0.048	0.084	0.017	0.003
<i>F - Stat</i>	19.72 (0.000)***	40.14 (0.000)***	16.98 (0.000)***	23.90 (0.000)***	74.86 (0.000)***	152.59 (0.000)***	16.07 (0.000)***	15.50 (0.000)***	5.39 (0.002)***	14.58 (0.000)***	8.76 (0.000)	8.94 (0.000)***
<i>Obs.</i>	480	480	480	480	480	480	480	480	480	480	480	480
<i>State Fixed Effects</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>

***, **, * Significant at 1%, 5% and 10% respectively (standard errors in parentheses)

P-values are in parentheses in case of F-Statistics

4.4.2.2 Convergence in the State Level Elections

Table 4.8, 4.9 and 4.10 show the results for the state level (assembly) elections. In this case the date of election is state variant. Similarly, other variables are also time and state variant. In this case we control for both, the state and time fixed effects in the OLS framework.

Table 4.8 presents the results of the fiscal deficit, which is the result of many policy positions of the right, center and the left-wing governments in the electoral term and the year of the election. Unlike the parliamentary election, the year of election at the state level does not show any opportunistic behavior in the case of deficits. However, when the time (year) fixed effects are controlled for, the election year deficit turns out to be positive, though not significant. That is, a reduction in deficit close to the election can be spurious and, hence, controlling for time fixed effects could change the sign of the coefficient from negative to positive. So, there does not seem to be the presence of a sound budget cycle in the state level elections for the deficit variable. The fiscal deficits under the left-wing government are higher than for the right-wing and the centrist governments as also confirmed by (Roesel, 2016). As the left-wing government displays high deficits, the right-wing and the centrist parties also run higher deficits when the state and time effects both are controlled, albeit not significant.

The left-wing party does not exhibit opportunistic behavior as it runs lower deficits in the year of election, whereas, the right-wing and the centrist governments show opportunistic behavior by having larger deficits in the year of the election, when only year fixed effects is controlled. In this case the right-wing is significantly opportunistic in the case of gross fiscal deficit, and the centrist party is opportunistic in both, gross fiscal deficit and revenue deficit at 10% level of significance. Also, none of the three different ideologue governments display any convergence in their behavior. The opportunistic and partisan behavior of gross fiscal deficit has been depicted in Figure B.10 and that of primary and revenue deficits are shown in Figure B.11 (B.11a,

Table 4.8: Assembly (State) Elections: Deficit Variables

Variables	Fiscal Deficit		Primary Deficits		Revenue Deficits	
	I	II	III	IV	V	VI
<i>Yr_Elects</i>	-0.127 (0.286)	0.319 (0.279)	-0.028 (0.304)	0.266 (0.279)	-0.431 (0.228)*	0.215 (0.203)
<i>Left</i>	0.054 (0.345)	0.624 (0.230)**	0.550 (0.468)***	0.696 (0.236)***	0.180 (0.251)	0.832 (0.289)***
<i>Right</i>	-0.250 (0.357)	0.566 (0.356)	-0.420 (0.446)	0.521 (0.315)	0.073 (0.697)	0.237 (0.372)
<i>Center</i>	-0.158 (0.438)	0.307 (0.317)	-0.098 (0.497)	0.401 (0.291)	-0.058 (0.371)	0.353 (0.319)
<i>Elect_l</i>	-0.361 (0.392)	-0.268 (0.348)	-0.516 (0.430)*	-0.202 (0.347)	-0.039 (0.294)	-0.302 (0.234)
<i>Elect_r</i>	0.681 (0.555)*	-0.225 (0.570)	0.627 (0.590)	-0.145 (0.595)	0.834 (0.561)	0.022 (0.426)
<i>Elect_c</i>	0.124 (0.416)*	-0.368 (0.357)	0.214 (0.465)	-0.157 (0.362)	0.556 (0.315)*	-0.158 (0.265)
<i>Density</i>	-0.001 (0.002)	0.008 (0.004)**	-0.007 (0.002)***	0.006 (0.003)*	0.004 (0.003)	0.001 (0.005)
<i>Gsdp-g</i>	-0.072 (0.019)***	-0.030 (0.026)	-0.042 (0.015)**	-0.006 (0.021)	-0.061 (0.019)***	-0.016 (0.025)
<i>Gsdp-g(-1)</i>	-0.072 (0.019)***	-0.011 (0.020)	-0.018 (0.016)	0.005 (0.019)	-0.042 (0.020)**	-0.007 (0.023)
<i>Allied</i>	0.026 (0.186)	0.160 (0.104)	0.103 (0.165)	0.065 (0.099)	-0.211 (0.267)	0.147 (0.178)
<i>Cldum_s</i>	-0.098 (0.322)	0.287 (0.203)	-0.276 (0.292)	0.133 (0.201)	0.063 (0.466)	0.214 (0.241)
<i>Constant</i>	6.294 (0.990)***	1.174 (1.490)	5.435 (0.932)***	-0.010 (1.336)	1.187 (1.505)	-1.041 (1.917)
<i>Left=Right</i> [F-Test(.)]	2.300 (0.149)	0.040 (0.850)	14.01 (0.022)***	0.380 (0.548)	0.030 (0.866)	2.950 (0.106)*
<i>Left=Centre</i> [F-Test(.)]	0.660 (0.430)	1.700 (0.212)	6.890 (0.019)	1.490 (0.241)	0.960 (0.343)	5.070 (0.039)**
<i>Right=Centre</i> [F-Test(.)]	0.150 (0.701)	0.450 (0.511)	1.830 (0.196)	0.120 (0.732)	0.040 (0.849)	0.220 (0.649)
<i>Elect_l=Elect_r</i> [F-Test(.)]	4.490 (0.051)*	0.010 (0.932)	4.77 (0.045)**	0.010 (0.909)	2.720 (0.120)	0.540 (0.475)
<i>Elect_l=Elect_c</i> [F-Test(.)]	2.180 (0.160)	0.120 (0.732)	4.100 (0.061)*	0.020 (0.888)	3.790 (0.070)*	0.280 (0.605)
<i>Elect_r=Elect_c</i> [F-Test(.)]	1.121 (0.288)	0.060 (0.807)	0.620 (0.442)	0.000 (0.984)	0.310 (0.586)	0.170 (0.689)
R^2	0.077	0.055	0.033	0.114	0.080	0.4936
<i>F - Stat</i>	5.40 (0.002)***	14.48 (0.000)***	14.49 (0.000)***	34.44 (0.000)***	4.27 (0.005)***	16.55 (0.000)***
<i>Obs.</i>	464	464	464	464	464	464
<i>Time Fixed Effects</i>	No	Yes	No	Yes	No	Yes
<i>State Fixed Effects</i>	Yes	Yes	Yes	Yes	Yes	Yes

***, **, * Significant at 1%, 5% and 10% respectively (standard errors in parentheses)

P-values are in parentheses in case of F-Statistics

B.11b). A significant F-statistics value shows that the models are fitted well. The demographic (larger population density) and economic variable (higher GSDP growth rate and its lag) generally lower the fiscal deficit. However, higher density increases the deficit when the time and state fixed effects are controlled.

If the union and the state have the same ruling party or state is an ally of it, the *Allied* entails a higher deficit. The coalition government at the state level displays higher deficit when the state and time fixed effects are both controlled for. Both of these results are contrary to those at the union level. The left-and right-wing governments are not very different from each other in terms of incurring gross fiscal deficit, but the primary and revenue deficits exhibit a difference. The left and centrist governments are not dissimilar from each other, except in the case of revenue deficit. Similarly, the right and the centrist government's position on deficits is different from each other though the difference is not found to be significant. Further, the year of the election behavior of the left-and the right-wing are significantly different from each other in terms of gross fiscal deficit and primary deficit, whereas, the center and left-wing are significantly different from each other with regard to primary and revenue deficits. However, the year of the election behavior of the right and the centrist parties in terms of deficits is not different from each other.

Table 4.9 shows the results of the expenditure variables at the state level. As in the case of the parliamentary elections, the expenditure in the year of the assembly elections is higher in all the cases except for social sector expenditure; but it is found to be significant only in the case of capital expenditure. The social sector expenditure shows a dip in the year of election, though not significant. The left-oriented parties are found to be spending less in aggregate in the electoral term whereas, the right-wing parties exhibit a higher expenditure when both the year and time effects are controlled in the case of both aggregate and revenue expenditure (not significant). This result is contrary to those derived by Kelly-Gagnon and Geloso (2013) and De Haan and Sturm (1994), which state that the left-wing spends more than the right-wing governments. The right-wing party incurs a very high and significant capital expenditure but lower

Table 4.9: Assembly (State) Elections: Expenditure Variables

Variables	Aggregate Expenditure		Revenue Expenditure		Capital Expenditure		Social Expenditure	
	I	II	III	IV	V	VI	VII	VIII
<i>Yr-Elects</i>	0.243 (0.425)	0.210 (0.414)	0.009 (0.226)	0.182 (0.313)	9.157 (6.783)	6.806 (3.815)*	-0.018 (0.232)	-0.080 (0.211)
<i>Left</i>	-1.874 (0.613)***	-0.919 (0.690)	-1.215 (0.597)*	-0.704 (0.455)	3.973 (3.936)	-5.295 (1.978)**	-1.183 (0.432)**	-1.463 (0.258)***
<i>Right</i>	-0.951 (0.809)	1.277 (0.753)	-1.168 (0.612)*	0.338 (0.482)	18.566 (5.395)***	9.789 (3.865)**	-1.087 (0.499)**	-0.013 (0.264)
<i>Center</i>	0.196 (0.469)	0.911 (0.548)	-0.227 (0.423)	0.477 (0.389)	14.490 (6.887)**	8.734 (5.458)	-0.521 (0.311)	0.023 (0.242)
<i>Elect_l</i>	-0.509 (0.571)	-0.194 (0.767)	-0.211 (0.304)	-0.132 (0.421)	-2.697 (6.253)	-5.430 (4.534)	-0.521 (0.311)	0.386 (0.291)
<i>Elect_r</i>	0.051 (0.544)	-0.945 (0.661)	0.685 (0.495)	0.116 (0.469)	-10.369 (7.684)	-9.433 (5.269)*	0.552 (0.449)	-0.133 (0.279)
<i>Elect_c</i>	-0.793 (0.545)	-1.088 (0.599)*	-0.215 (0.349)	-0.514 (0.417)	-12.178 (8.666)**	-10.453 (4.956)**	0.024 (0.325)	-0.133 (0.279)
<i>Density</i>	-0.002 (0.008)	0.035 (0.007)***	0.003 (0.005)	0.025 (0.004)***	0.219 (0.031)***	0.077 (0.036)**	-0.001 (0.004)	0.014 (0.004)***
<i>Gsdp_g</i>	-0.108 (0.031)***	-0.131 (0.030)***	-0.094 (0.027)***	-0.119 (0.027)***	0.264 (0.116)**	0.026 (0.078)	-0.035 (0.014)**	-0.052 (0.012)***
<i>Gsdp_g(-1)</i>	-0.082 (0.014)***	-0.097 (0.012)***	-0.060 (0.016)***	-0.084 (0.015)***	0.161 (0.143)	-0.105 (0.131)	-0.020 (0.008)**	-0.036 (0.006)***
<i>Allied</i>	-0.581 (0.380)	-0.796 (0.499)**	-0.511 (0.275)*	-0.437 (0.322)	-4.159 (4.722)	-6.823 (3.283)*	-0.136 (0.158)	-0.27 (0.216)
<i>Cldum_s</i>	0.147 (0.542)	1.263 (0.465)**	-0.148 (0.378)	0.692 (0.303)**	7.036 (4.732)	-0.337 (2.598)	-0.236 (0.249)	0.256 (0.208)
<i>Constant</i>	24.970 (2.845)***	1.263 (0.463)**	17.912 (1.505)***	0.692 (0.303)**	-87.964 (14.689)***	-0.337 (2.598)	9.319 (1.296)***	0.256 (0.208)
<i>Left=Right</i> [F-Test(.)]	1.430 (0.250)	9.950 (0.006)***	0.010 (0.937)	5.500 (0.033)**	9.190 (0.008)***	14.250 (0.002)***	0.050 (0.822)	18.23 (0.0007)***
<i>Left=Centre</i> [F-Test(.)]	14.250 (0.002)***	6.670 (0.020)**	7.480 (0.015)**	10.770 (0.005)***	4.470 (0.052)**	5.740 (0.030)**	7.530 (0.015)**	34.030 (0.000)***
<i>Right=Centre</i> [F-Test(.)]	2.460 (0.137)	0.280 (0.607)	4.180 (0.058)*	0.100 (0.754)	0.520 (0.481)	0.060 (0.805)	2.630 (0.125)**	0.010 (0.916)
<i>Elect_l=Elect_r</i> [F-Test(.)]	4.330 (0.055)*	1.670 (0.216)	4.680 (0.047)**	0.290 (0.596)	11.340 (0.004)***	1.030 (0.327)	3.530 (0.079)*	0.200 (0.663)
<i>Elect_l=Elect_c</i> [F-Test(.)]	0.340 (0.569)	1.780 (0.201)	0.000 (0.991)	1.040 (0.323)	6.340 (0.024)**	1.550 (0.232)	0.470 (0.502)	9.040 (0.008)***
<i>Elect_r=Elect_c</i> [F-Test(.)]	2.450 (0.138)	0.050 (0.826)	2.790 (0.115)	1.500 (0.239)	0.330 (0.576)	0.110 (0.748)	2.170 (0.161)	1.080 (0.315)
<i>R²</i>	0.084	0.024	0.001	0.014	0.029	0.487	0.035	0.002
<i>F - Stat</i>	51.00 (0.000)***	13.22 (0.000)***	9.97 (0.000)***	25.580 (0.000)***	6.160 (0.001)**	70.17 (0.000)***	9.180 (0.000)***	24.29 (0.000)***
<i>Obs.</i>	464	464	464	464	464	464	464	464
<i>Time Fixed Effects</i>	<i>No</i>	<i>Yes</i>	<i>No</i>	<i>Yes</i>	<i>No</i>	<i>Yes</i>	<i>No</i>	<i>Yes</i>
<i>Year Fixed Effects</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>

***, **, * Significant at 1%, 5% and 10% respectively (standard errors in parentheses)

P-values are in parentheses in case of F-Statistics

social sector expenditure. The centrist government displays higher expenditure in all respects, except the revenue and social sector expenditure, when only the state fixed effects are controlled. The year of election expenditure for the left parties show no opportunism as it runs a lower expenditure in all respects except the social sector expenditure. The social expenditure heads show higher spending in the year of election, when the time and the year fixed effects are controlled, though it is not

significant. The right-wing year of the election expenditures show higher aggregate, revenue and social sector expenditures when only the state fixed effects are controlled. The capital expenditure in the year of election, under the right-wing government, shows a dip. The centrist government does not show opportunistic behavior with regard to the different expenditure components, except in the case of social sector expenditure. There is not very strong convergence in the right-wing opportunistic and partisan behavior in revenue expenditure. The others tend to diverge. The opportunistic and partisan cycles have been shown in the Figure B.12 (B.12a, B.12b) for the aggregate and the revenue expenditure, whereas, for the capital and the social sector expenditure are shown in Figure B.13 (B.13a, B.13b).

The density of population and GSDP growth rate (and its lag) respectively exhibit higher spending (when year and time fixed effects both are controlled), whereas the latter displays lower expenditure except in the case of capital expenditure (Table 4.9). The variables *Allied* implies lower expenditure throughout, whereas a coalition government implies higher aggregate expenditure. The coalition government at the state level derives higher revenue and incurs higher social sector expenditure when both state and time fixed effects are controlled. A higher capital expenditure under the coalition government is exhibited only when we control for the state fixed effects.

There is a significant difference in the expenditure pattern of the left and right-wing governments in all expenditure components. Similarly, there is a significant difference between the left-and the centrist governments execution of policies related to different expenditure components. There is some difference between the right-wing and the centrist governments in revenue and social sector expenditure, whereas, the remaining two - aggregate and capital expenditures - show a similarity. Further, in the year of election, there is a significant difference between the left and the right-wing behavior. The left and the centrist parties display a difference only in the case of capital and social sector expenditure, whereas, the remaining two - aggregate and revenue expenditures - do not show any difference. Moreover, there is no difference between the right-wing and the centrist governments in all the expenditure components.

Table 4.10: Assembly (State) Elections: Revenue Variables

Variables	Aggregate Receipts		Revenue Receipts		Capital Receipts		Tax Revenue		Non-tax Revenue		Sales Tax	
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
<i>Yr_Elects</i>	0.464 (0.381)	0.215 (0.358)	0.440 (0.250)*	-0.033 (0.174)	9.232 (6.809)	6.852 (3.836)*	0.130 (0.142)	-0.074 (0.118)	0.309 (0.240)	0.041 (0.204)	0.055 (0.066)	-0.092 (0.047)*
<i>Left</i>	-1.568 (0.491)***	-0.417 (0.708)	-1.395 (0.633)**	-1.536 (0.531)	4.131 (3.940)	-5.315 (1.948)**	-1.260 (0.355)***	-1.335 (0.325)***	-0.135 (0.313)	-0.201 (0.270)	-0.179 (0.133)	-0.234 (0.135)
<i>Right</i>	-0.338 (0.850)	1.874 (0.990)*	-1.241 (1.113)	0.101 (0.662)	18.588 (5.422)***	9.839 (3.954)**	-0.944 (0.590)	-0.254 (0.449)	-0.297 (0.757)	0.355 (0.305)	-0.284 (0.268)	-0.330 (0.231)
<i>Center</i>	0.374 (0.443)	1.045 (0.570)*	-0.169 (0.560)	0.124 (0.496)	14.381 (6.898)*	8.658 (5.509)	-0.319 (0.297)	-0.176 (0.362)	0.150 (0.354)	0.300 (0.242)	-0.085 (0.161)	-0.119 (0.145)
<i>Elect_l</i>	-0.811 (0.575)	-0.087 (0.739)	-0.173 (0.340)	0.170 (0.338)	-2.645 (6.279)	-5.298 (4.466)	0.084 (0.156)	0.294 (0.217)	-0.256 (0.258)	-0.124 (0.249)	0.150 (0.089)	0.115 (0.082)
<i>Elect_r</i>	0.507 (0.670)	-1.463 (0.786)*	-0.149 (0.639)	0.095 (0.454)	-10.429 (7.729)	-9.426 (5.303)*	0.140 (0.396)	0.239 (0.230)	-0.289 (0.350)	-0.145 (0.322)	0.110 (0.095)	0.152 (0.091)
<i>Elect_c</i>	-0.545 (0.615)	-0.648 (0.440)	-0.771 (0.363)**	-0.356 (0.243)	-12.099 (8.702)	-10.398 (4.991)*	-0.381 (0.186)*	-0.171 (0.239)	-0.390 (0.340)	-0.185 (0.301)	0.060 (0.103)	0.087 (0.091)
<i>Density</i>	-0.001 (0.008)	0.034 (0.008)***	0.000 (0.006)	0.024 (0.009)**	0.219 (0.031)***	0.076 (0.036)*	0.004 (0.005)	0.017 (0.008)**	-0.005 (0.002)**	0.007 (0.004)*	0.0004 (0.001)	-0.001 (0.002)
<i>Gsdp_g</i>	-0.101 (0.031)***	-0.125 (0.029)***	-0.032 (0.014)**	-0.103 (0.014)***	0.278 (0.115)**	0.030 (0.077)	-0.023 (0.014)	-0.052 (0.017)***	-0.010 (0.011)	-0.039 (0.018)**	-0.015 (0.003)***	-0.022 (0.005)***
<i>Gsdp_g(-1)</i>	-0.075 (0.016)***	-0.086 (0.019)***	-0.017 (0.013)	-0.077 (0.017)***	0.161 (0.141)	-0.105 (0.127)	-0.013 (0.007)*	-0.039 (0.011)***	-0.005 (0.015)	-0.039 (0.018)**	-0.006 (0.003)*	-0.010 (0.004)**
<i>Allied</i>	-0.482 (0.346)	-0.656 (0.457)	-0.299 (0.254)	-0.584 (0.330)*	-4.376 (4.717)	-6.901 (3.268)*	-0.565 (0.183)***	-0.670 (0.223)***	0.265 (0.169)	0.086 (0.199)	-0.102 (0.089)	-0.075 (0.090)
<i>Cldum_s</i>	0.072 (0.502)	1.169 (0.405)**	-0.211 (0.551)*	0.476 (0.341)	-88.06 (14.734)***	-0.380 (2.651)	-0.026 (0.304)	0.312 (0.255)	-0.185 (0.320)	0.166 (0.176)	0.009 (0.191)	-0.036 (0.169)
<i>Constant</i>	24.159 (2.965)***	11.797 (3.011)***	16.725 (2.450)***	10.615 (2.995)***	-88.066 (14.734)***	-18.078 (12.364)	9.497 (1.974)***	6.421 (2.692)**	7.228 (0.832)***	4.194 (1.044)**	4.098 (0.588)***	4.481 (0.601)***
<i>Left=Right</i> [F-Test(.)]	2.280 (0.151)	8.100 (0.012)**	0.020 (0.883)	6.370 (0.023)**	8.730 (0.009)***	13.85 (0.002)***	0.300 (0.594)	5.510 (0.033)**	0.100 (0.758)	4.82 (0.044)**	0.26 (0.620)	0.024 (0.633)
<i>Left=Centre</i> [F-Test(.)]	13.77 (0.002)***	5.390 (0.035)**	7.90 (0.013)**	13.23 (0.002)***	4.310 (0.055)*	5.810 (0.029)**	7.370 (0.015)**	11.99 (0.003)	2.970 (0.105)	5.760 (0.029)**	1.020 (0.328)	1.760 (0.328)
<i>Right=Centre</i> [F-Test(.)]	0.910 (0.355)	1.50 (0.239)	1.160 (0.297)	0.000 (0.970)	0.560 (0.466)	0.080 (0.783)	1.210 (0.288)	0.040 (0.840)	0.91 (0.356)	0.040 (0.851)	0.790 (0.386)	1.020 (0.328)
<i>Elect_l=Elect_r</i> [F-Test(.)]	0.330 (0.572)	2.730 (0.119)	0.000 (0.966)	0.020 (0.885)	11.89 (0.003)***	1.110 (0.308)	0.020 (0.882)	0.030 (0.862)	0.020 (0.883)	0.010 (0.941)	0.140 (0.717)	0.090 (0.768)
<i>Elect_l=Elect_c</i> [F-Test(.)]	0.170 (0.685)	0.590 (0.453)	4.40 (0.053)*	2.710 (0.120)	6.520 (0.022)**	1.660 (0.216)	5.50 (0.033)**	3.570 (0.768)*	0.360 (0.559)	0.060 (0.811)	0.790 (0.389)	0.090 (0.768)
<i>Elect_r=Elect_c</i> [F-Test(.)]	0.0.000 (0.965)	0.920 (0.352)	1.540 (0.234)	0.790 (0.389)	0.280 (0.602)	0.100 (0.757)	1.600 (0.224)	1.200 (0.290)	0.140 (0.711)	0.010 (0.913)	0.190 (0.673)	0.290 (0.597)
<i>R²</i>	0.074	0.022	0.059	0.031	0.030	0.495	0.073	0.055	0.191	0.059	0.0006	0.002
<i>F - Stat</i>	27.23 (0.000)***	90.18 (0.000)***	16.59 (0.000)***	33.33 (0.000)***	6.43 (0.000)***	72.19 (0.000)***	4.78 (0.003)***	25.27 (0.000)***	6.85 (0.000)***	9.52 (0.000)***	7.41 (0.000)	30.34 (0.000)***
<i>Obs.</i>	464	464	464	464	464	464	464	464	464	464	464	464
<i>Time Fixed Effects</i>	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
<i>State Fixed Effect</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

***, **, * Significant at 1%, 5% and 10% respectively (standard errors in parentheses)
P-values are in parentheses in case of F-Statistics

Table 4.10 displays the result for different components of revenue including aggregate revenue. A higher expenditures deems it necessary to raise higher revenue. However, in terms of capturing the opportunistic behavior, the revenue variables display a reciprocal of opportunistic behavior related to the expenditure variables. The different political parties, in general, exhibit opportunistic behavior in the case of revenue receipts, tax revenue and sales tax, however, the remaining variables, such as aggregate receipts, capital receipts and non-tax revenue, show no opportunism. Since, sales tax is an indirect tax, and a higher sales tax can negatively affect the consumer and voters' sentiments in the year of election, hence, this has been kept opportunistically low and it is significant as well.

Clearly, the left-wing government keep the revenue receipts and, hence, different components of taxes lower as against its counter part of right and centrist parties. The capital receipts is the only component from which the left government is found to have a higher gains, and this happens when, only state fixed effects are controlled, though it is not found to be significant. The right-wing government systematically keeps lower non-tax revenue and lower sales tax, whereas, aggregate and revenue receipts are higher when the state and the year fixed effects are controlled. The capital receipts are higher and significant under the right-wing and the centrist governments. Additionally, the centrist governments derive higher aggregate receipts and non-tax revenue. The revenue receipt is higher when the state and year fixed effects are controlled. As the right-wing party, the centrist also obtains a lower tax revenue and sales tax. Further, the election year receipts are lower under the left-wing government, and these do not show any opportunistic behavior. The right-wing government derives lower capital receipts and not-tax revenue. The right-wing also obtains lower aggregate receipts in the year of the election, when both the state and the year fixed effects are controlled. The centrist incumbent generally obtains lower receipts in the year of the election. In fact, there is presence of weak convergence in opportunistic and partisan behavior of the centrist parties in revenue receipts and tax revenue when the year and state fixed effects both are controlled. The opportunistic and partisan cycles are shown in the Figure B.14 (B.14a and B.14b) for the aggregate revenue and

revenue receipts, in Figure B.15(B.15a and B.15b) for capital receipts and tax revenue and in Figure B.16 (B.16a and B.16b) for non-tax revenue and sales tax.

As in the case of expenditure components, the revenue variables also display a positive association with population density. Since a higher population density requires large expenses, this would require higher receipts as well. A higher GSDP growth rate and its lag continue to show lower receipts throughout. Similarly, the variable *Allied* implies lower receipts throughout, except in the case of non-tax revenue. If the state government is a coalition, it entails a less capacity to generate receipts and, hence, implies lower capital receipts. It is also associated with lower revenue receipts, tax revenue and non-tax revenue when only the state fixed effects are controlled. Generally, the coalition government also implies higher aggregate receipts, however, this is unlike the behavior for the union level coalition government.

In general, most of the revenue variables show that the left-and the right-wing governments are significantly different from each other. Similarly, the left-wing government is significantly different from the centrist in the case of all the revenue variables. However, right-wing and centrists governments do not differ from each other in terms of their revenue generation policies. Observing the year of the election behavior of the governments, it is found that the left and the right-wing parties are significantly different from each other in respect of capital receipts, whereas, no difference exists in the revenue generation policies of the remaining components. Similarly, there is a significant difference between the left-wing and the centrist parties with regard revenue receipts, capital receipts and receipt of the tax revenue. Moreover, there is no difference between the right-wing and the centrist parties in respect of their revenue generating policies. A value of the significant F-statistics implies that the models are fitted well in case of the revenue variables.

4.4.2.3 Convergence Synthesis

At the union level election, there is center-left-wing partisan and opportunist convergence in all the deficits heads. There is strong center-left partisan and the opportunist government convergence in the aggregate expenditure and capital expenditure, whereas weak convergence (converge but not significant) of revenue expenditure in the case of the right-wing partisan and the opportunist government. Similarly, the center-left partisan behavior converges with the opportunist government in the case of revenue receipts, tax revenue and non-tax revenue.

At the state level, convergence is not very strong. That is, there is no convergence in opportunistic and partisan behavior of any party in deficits, whereas there is weak convergence in aggregate and revenue expenditure for the right-wing. Further, the right-wing opportunistic and partisan behavior converge in the case of revenue receipts and tax revenue.

4.5 Conclusion

India is the biggest democracy in the world, but the understanding of the significance of political ideologies on the economic policy positions and its implementation needs to be strengthened. There are specific characteristics of political parties that define them as left, right and the centrist. However, this chapter concludes that political parties are not always tied to their ideology and partisan behavior. The basic findings of the paper indicate that ideological differences and its reflections in the economic policy are more visible at the national level elections and not at the assembly level. Similarly, the opportunistic behaviors of the parties were also more visible in the parliamentary election and not at the state level elections. There exists a strong PBC in all the deficit heads, aggregate expenditure, aggregate revenue, revenue receipts, tax revenue and sales tax with respect to the union level of elections. However, except capital expenditure and sales tax, none of the other variables show significant PBC for the state level elections.

Further, analyzing the union level election approximated at the state level, we find that there is center-left-wing partisan and opportunist convergence in all the deficits heads. There is a strong center-left partisan and opportunist government convergence in aggregate expenditure and capital expenditure, whereas weak convergence of revenue expenditure in the case of the right-wing partisan and opportunist government. Similarly, the center-left partisan behavior converges with the opportunist government in the case of revenue receipts, tax revenue and non-tax revenue. At the state level, convergence is not very strong. That is, there is no convergence in opportunistic and partisan behavior of any party in deficits, whereas there is weak convergence in aggregate and revenue expenditure for the right-wing. Further, the right-wing opportunistic and partisan behavior converge in the case of revenue receipts and tax revenue.

For the union as well as the state level, in most of the cases, a higher density of population is associated with higher deficit, expenditure as well as the receipts whereas, GDP and GSDP growth rate and their lags, respectively, show lower deficit, expenditure and revenue. Similarly, in most of the cases, if the center and state have the same ruling party then it displays a lower deficit, expenditure and revenue; this is also true in the case of the coalition government at the union and the state levels.

CHAPTER 5

The Center-State Political Transfer Cycles

5.1 Introduction

In a federal structure of a country, center is responsible for allocating and transferring funds for various economic activities to the state level. These funds can be mainly in the form of grants or loans. However, in a federation, the central government has the incentive, as also the capability, to manipulate the transfers given to the states (provinces/ sub national jurisdictions) so as to enhance the possibility of winning the election.¹ This idea is closely linked to the notion of a political budget cycle (PBC), which alleges that the incumbent can opportunistically manipulate the fiscal policy to increase the possibility of winning the election (see [Nordhaus, 1975](#); [Hibbs, 1977](#); [Drazen, 2000](#); and [Manjhi and Mehra, 2016](#) for a theoretical exposition and [Drazen and Eslava, 2010](#); [Aidt, Veiga, and Veiga, 2011](#); and [Chortareas, Logothetis, and Papandreou, 2016](#) on this issue).

After [Nordhaus \(1975\)](#), the brief forty years' history of political business cycle ([Hibbs, 1977](#); [Frey and Schneider, 1978b](#), [Cukierman and Meltzer, 1986](#), [Alesina, 1987](#), [1988](#) etc. under adaptive expectation) moved on to PBC introduced by [Rogoff and Sibert \(1988\)](#), [Rogoff \(1990\)](#), and further extended by [Drazen \(2000\)](#), where the latter two works cover the fiscal/ budget components in detail along with monetary variables in the framework of Active Fiscal Passive Monetary (AFPM) and not just

¹central government and the Union government have been used interchangeably.

the inflation-unemployment trade-off cycles based on the Phillips curve. The recent strand of research on PBC models are mostly based on fiscal and monetary policy under rational expectations can be attributed to the following: [Rogoff and Sibert \(1988\)](#), [Rogoff \(1990\)](#), [Persson and Tabellini \(1990\)](#), [Alesina, Roubini, and Cohen \(1997\)](#), [Shi and Svensson \(2002a\)](#), [Shi and Svensson \(2002b\)](#), [Shi and Svensson \(2006\)](#), [Persson and Tabellini \(2003\)](#), [Brender and Drazen \(2005\)](#), [Drazen and Eslava \(2010\)](#), [Aidt, Veiga, and Veiga \(2011\)](#), [Efthyvoulou \(2012\)](#), [Manjhi and Mehra \(2016\)](#) etc (for detail analysis refer to Chapters 3 and 4).

In the concept similar to PBC, one can hypothesize the center-state political transfer cycle (PTC) and pose the question – can the national level government strategically transfer financial resources to the states? Also, whether by transferring the resources, she/ he can increase the chances of winning the election and form the government in the next electoral term? For instance, it is shown that, opportunistic behavior helped the incumbent to win the election in Colombian municipality ([Drazen and Eslava, 2010](#)) and spending more opportunistically close to the election helped winning the election in the Portuguese municipality ([Aidt, Veiga, and Veiga, 2011](#)). Further, [Chortareas, Logothetis, and Papandreou \(2016\)](#) also confirm that opportunistic expenditure by the incumbent is electorally rewarded in Greece’s municipality.

The specific studies related to the analysis of the center-state transfers are as follows. [Kroth \(2012\)](#) uses a panel data set of 9 provinces of South Africa over the period 1995-2010, and derives two important results. First, provinces where the national ruling party faces higher electoral competition tend to receive higher per capita transfers in the year before the election. Second, this increase is driven by a conditional grant, which is the non-formulae-based component of the total inter-governmental transfer. [Khemani \(2004\)](#) shows that electoral budget cycle affect the composition of local budgets. That is, Indian state governments do not manipulate aggregate fiscal variables such as total spending or deficits in the run-up to an election, but instead manipulate the individual budget items and investment on public projects. The evidence of local budget cycle can also be found in [Reid \(1998\)](#) and [Kneebone and McKenzie \(2001\)](#)

for the Canadian provinces. [Drazen and Eslava \(2010\)](#) bring a descriptive evidence of a significant increase in investment, prior to elections in local governments in Colombia, an increase which is only partially compensated by a decrease in government consumption, whereas [Brender and Drazen \(2013\)](#) find a large change in the composition of expenditure in the established democracies during the election. [Alesina and Paradisi \(2014\)](#) find a strong PBC, particularly for South of Italy with use of a ‘lower tax’ regime close to the election. [Baskaran, Brender, Blesse, and Reingewertz \(2016\)](#) find that a low share of revenue raised by the Israeli local municipalities budget creates excessive dependence on central government transfers, and hence the PBC. However, a tightening of the monitoring procedures eliminates it. [Brollo and Nannicini \(2012\)](#) find that, the aligned municipalities receive larger infrastructure transfers in Brazil, whereas, [Baskaran and Hessami \(2014\)](#) find that, left-wing state government favor more to the left aligned, but the right-wing state government favors the non-aligned municipalities. In fact, right-wing state government had to ‘buy off’ the unaligned municipalities as there was only few local councils who had absolute right-wing majorities during the tenure. [Sengupta \(2011\)](#) demonstrates that federal welfare may actually increase with the politically motivated transfers, and the state ruled by the same government as the center receives higher grants and, hence, more public good. [Sengupta \(2016\)](#) finds that if the central government grant is tied up with a public project of the province, provincial tax and central transfers tend to be strategic substitutes: higher central transfer lowers the marginal utility of public project to the province and the province responds by cutting down taxes. [Chortareas, Logothetis, and Papandreou \(2016\)](#) find an opportunistic PBC pattern in the budget balance, in the total expenditure and the investment expenditure, and in the borrowing revenues, irrespective of whether the mayor runs for the reelection or not, or whether the incumbents are politically aligned with the central government or not. Also, the opportunistically enhanced expenditure by the incumbent is electorally rewarded.

To study the political determinants of transfers, the method of pooled mean group (PMG) and to analyze the effect of politically motivated transfer on electoral outcome, Logit method has been used for the period covering *1980-81* to *2010-11*. We

consider both, parliamentary (national/ union) and assembly (state) level elections. The derived results in Indian federal structure with respect to the political determinants of transfers are as follows:

- The political transfer cycles are pronounced more in the year before the parliamentary, and in the year of the assembly elections, in the case of loan from the center, whereas, transfer cycles in grants from the center are found only in the year before the assembly elections.
- The right-wing and the coalition government in general provides less transfers to the states in both, the year of the union and state elections, with the exception of higher grants from the center to the states in the year of the assembly election.
- Having the same party in power at the union and state levels, or state ruling party being aligned to the union government, is associated with higher grants and loans than the non-aligned ones.

The results pertaining to the second part of the chapter, that is, the effect of financial transfer of resources on the electoral outcome, in case of both the parliamentary and assembly elections, are as follows:

- There are not very strong results of politically motivated transfers that affect the victory of the incumbent for both, parliamentary and assembly elections. However, the opportunistic manipulations of grants from the center in the year before the parliamentary election, and loan from the center in the year of the assembly elections, can help the incumbent to regain its power.
- The economic variable, inflation is harmful for the incumbent as it increases the likelihood of losing the election, both union and state level ones.
- Similarly, a right-wing government is more likely to win the election, whereas, if the center and state have the same government or state government is an ally, the possibility of retaining power for the union government is less but it is higher in the case of the state level government. Further, a coalition government, in general, reduces the winning possibility in both, the parliamentary and the state

elections.

The section-wise framework of this chapter is as follows. Section 5.2 covers a brief description of the Indian federal structure. The data and variables have been explained in Section 5.3. The tracing of PTC has been presented in Section 5.4 using pooled mean group method. Section 5.5 discusses the effect of transfer variables and controls on the probability of winning the election in both, the union and the state level of the elections by using the Logit model. Section 5.6 concludes the chapter.

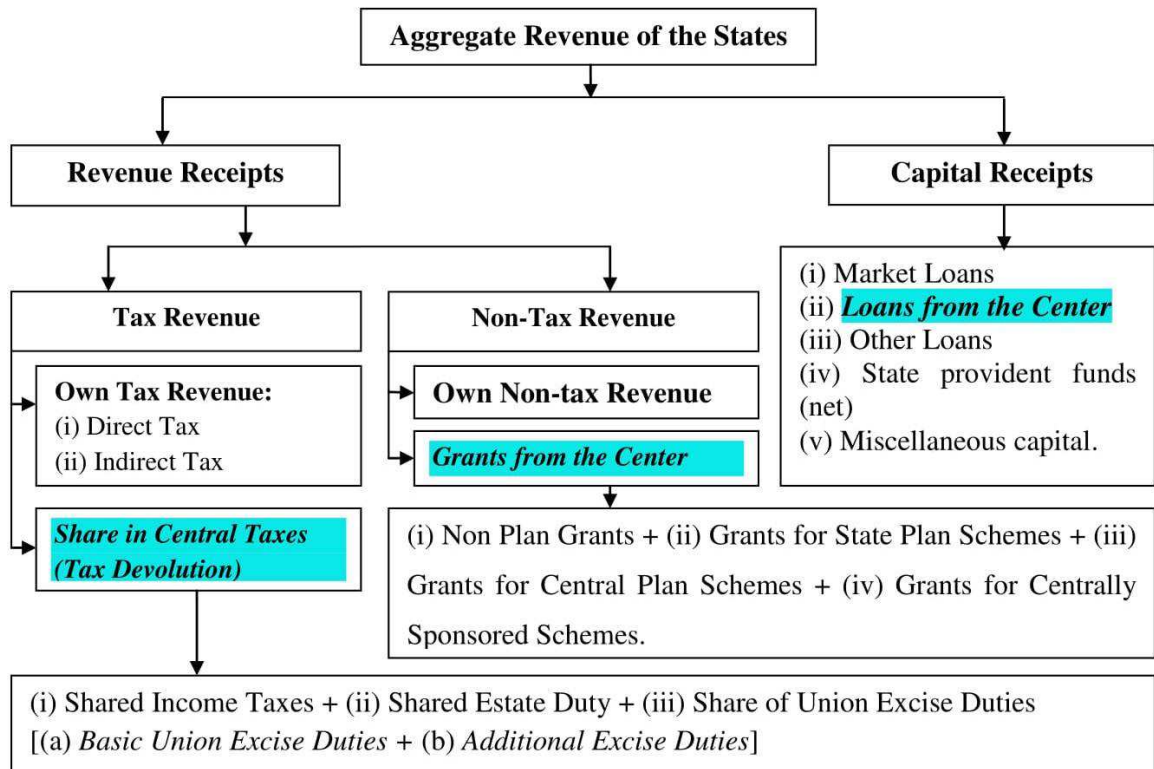
5.2 Fiscal Federalism in India

With the onset of economic liberalization in a number of countries in the post 1980s some of them, namely, China, Brazil, Argentina and Russia have moved toward a federal structure of centripetal kind, whereas, some big federations such as, Canada, United States and Australia have been structured more as the centrifugal type.² India has moved from a centralized quasi-federation to a co-operative and competitive structure of the center-state power relationship and it seems to have commonality with the former group. For India, the first three decades after independence in 1947, till the late 1980s, can be termed as the phase of centralized federation. The subsequent post reform era can be broadly termed as that of cooperative-cum-competitive federation. This phenomenon is also supported by the idea of a coalitional structure of the government, which came into existence effectively in the early 1990s. That is, the state government that happened to be an ally of the central government would mostly co-operate whereas the non-allied ones would compete (Bagchi, 2003; Chakraborty, 2003).

The structure of the Indian federation comprises of three tiers - national (center), sub-national (state) and sub-sub-national (panchayat/ municipality/ district councils/ village councils). On several occasions, states have sought for higher autonomy, but

²When the center of power is the Union then the federal structure is of centripetal type whereas opposite is the case of centrifugal type.

Figure 5.1: Schematic Presentation of States Revenue



the center has always maintained its supremacy in decision making. In fact, in some cases center has even amended the constitution to move items from the state list to the concurrent list, and thus increase its own share of spending (George and Gulati, 1985). There is a clearly demarcated line of revenue generation at the national and sub-national levels.

Figure 5.1 shows the basic structure of the revenue and capital receipts. The transfers from the center to the states under study are the components of revenue and capital receipts (colored the boxes in blue 5.1). The total revenue of the state consist of total revenue receipts and the capital receipts (the schematic presentation has been shown in Figure B.2 also in Appendix B and the boxes of the transfer variables are colored as navy blue). The total revenue receipts contain tax revenue and non-tax revenue. The tax revenue is further segregated into state’s own tax revenue and shared taxes (tax devolution). The tax devolution consists of: (i) shared income taxes, (ii) shared estate duty, and (iii) share of union excise duties. The total non tax revenue consists

of states own non tax revenue and grants from the central government. The grants from the center have four components, namely: (i) non plan grants, (ii) grants for state plan schemes, (iii) grants for central plan schemes, and (iv) grants for centrally sponsored schemes. The capital receipts contain following: (i) market loans (ii) loan from the center (iii) other loans (iv) state provident funds etc. For our purposes of analysis and discussion of transfer cycles, we consider the blue colored italicized transfer variables from Figure 5.1 namely, grants from the center (*Gfc*), loans from the center (*Lfc*) and tax devolution (*Td*).³ Also, effectively, there are three ways the center can transfer the resources, namely:

- (i) Statutory transfers=Shared taxes + Non plan grants
- (ii) Grants for state plan schemes
- (iii) Discretionary transfers=Grants for central plan schemes + Grants for centrally sponsored schemes.

There are three institutions that control the transfers from the center to the states. Firstly, Finance Commission (FC) decides on the level of the tax devolution and non plan grants and, since FC is an independent constitutional body, the direct political influence is the least possible scenario here.⁴ So far, 14 FC reports have been tabled, and almost all have been accepted by the central government. Secondly, Planning Commission (now NITI Aayog) recommends grants and loans for implementing development schemes.⁵ Finally, grants are provided by the different ministries to the specific projects fully funded by the center (central plan schemes) or the cost of the development schemes are shared by states (centrally sponsored schemes). The grants for state plan schemes require center's approval of the projects proposed by states;

³The detailed definition and the mechanism of transfers are provided in Appendix A.

⁴The finance commission is a unique arrangement by the architects of the constitution of India. It addresses the revenue and expenditure imbalance of the union (center) and the state governments. The most important aspect is about the division of power to raise and share the revenues and functional responsibilities. The FC is a directive authority which decides on tax sharing between center and the state through grants, loans and devolutions. The FC is an independent body, appointed by the president of India every five years, yet there is the scope for the central government under clause 3(c) of article 280 which reads, "any other matter referred to the commission by the president in the interest of sound finance", to put certain restrictions on Finance Commission.

⁵After the formation of new government in 2014, the Planning Commission has been replaced by National Institution for Transforming India (NITI Aayog).

hence, there is a possibility of some discretion (Rao and Singh, 2003). In general, the possibility of political influence cannot be ruled out in the case of grants from the center and loan from the center, but this may not directly imply manipulation of tax devolution unless clause 3(c) of article 280 is being used to direct the FC by the President of India for sound finance of the state. Moreover, even if political manipulation is the least possible scenario in tax devolution, it has been considered in this chapter for the comparative robustness check relative to grants from the center and loan from the center.

One of the bases for the transfer from center to states is the revenue expenditure imbalance at the state level. That is, states might go on spending without any constraint (or without worrying much about the fiscal deficit), because that would, in any case, be compensated by the union government through transfers. In conclusion, this mechanism can create a moral hazard problem and lack of discipline among the states. It is in this respect that FCs have been criticized for the use of grants to fill the revenue-expenditure gaps claimed by the states (Rao and Singh, 2007). The *Gfc* and *Td* are mostly under the purview of FC. However, there is already a greater role to be played by the Planning Commission (now NITI Aayog) and central government for the transfers, such as *Gfc* and *Lfc*. Overall, it seems that the central government tries to maintain political control over the transfers in some way. Also, there is evidence of attempts to influence the whole process of the transfers. Rao and Singh (2007) and Rudolph and Rudolph (2001) state that, even though the FCs use different formulaic based decision on transfers or grants, it has been observed that the states which are represented as the member of the commission do relatively better in terms of the received awards.

In fact, there exists a large body of literature on the politics and the political economy of transfers in India in federal context, namely, Rao and Singh (1999), Biswas and Marjit (2005), Dasgupta, Dhillon, and Dutta (2004), Arulampalam, Dasgupta, Dhillon, and Dutta (2009), and Rao and Singh (2007). Rao and Singh (1999) demonstrate that, implicit transfers in India disproportionately benefit the richer states

whereas, [Biswas and Marjit \(2005\)](#) show that states' representation in the cabinet of the central government affects the state-wise distribution of Letters of Intent and Industrial Licenses. [Dasgupta, Dhillon, and Dutta \(2004\)](#) and [Arulampalam, Dasgupta, Dhillon, and Dutta \(2009\)](#) construct a redistributive model of politics where the central government is an opportunist and uses its discretion to disproportionately grant the aligned states in India, whereas, it is to the aligned municipalities by the president in case of Brazil ([Brollo and Nannicini, 2012](#)). [Rao and Singh \(2007\)](#) analyzes the institutional process through which reform takes place and the influence of politics on institutions such as FC. There are studies that cover the political influence, for instance, [Inman and Rubinfeld \(1994\)](#), [Dixit and Londregan \(1995, 1996, 1998a, 1998b\)](#) and [Lindbeck and Weibull \(1987\)](#). [Inman and Rubinfeld \(1994\)](#) show how central government's local representation and assignment of responsibility affect the political values of participation, protection of individual rights, development of civic virtues, allocation of goods and services and, hence, economic efficiency. [Dixit and Londregan \(1995, 1996, 1998a, 1998b\)](#) and [Lindbeck and Weibull \(1987\)](#) construct a theoretical model of tactical redistribution, which describes how a political party will design its policy platform in order to target the electoral goals. Among the last set of papers, the former study aims to analyze the maximization of vote share and the latter targets winning the election.

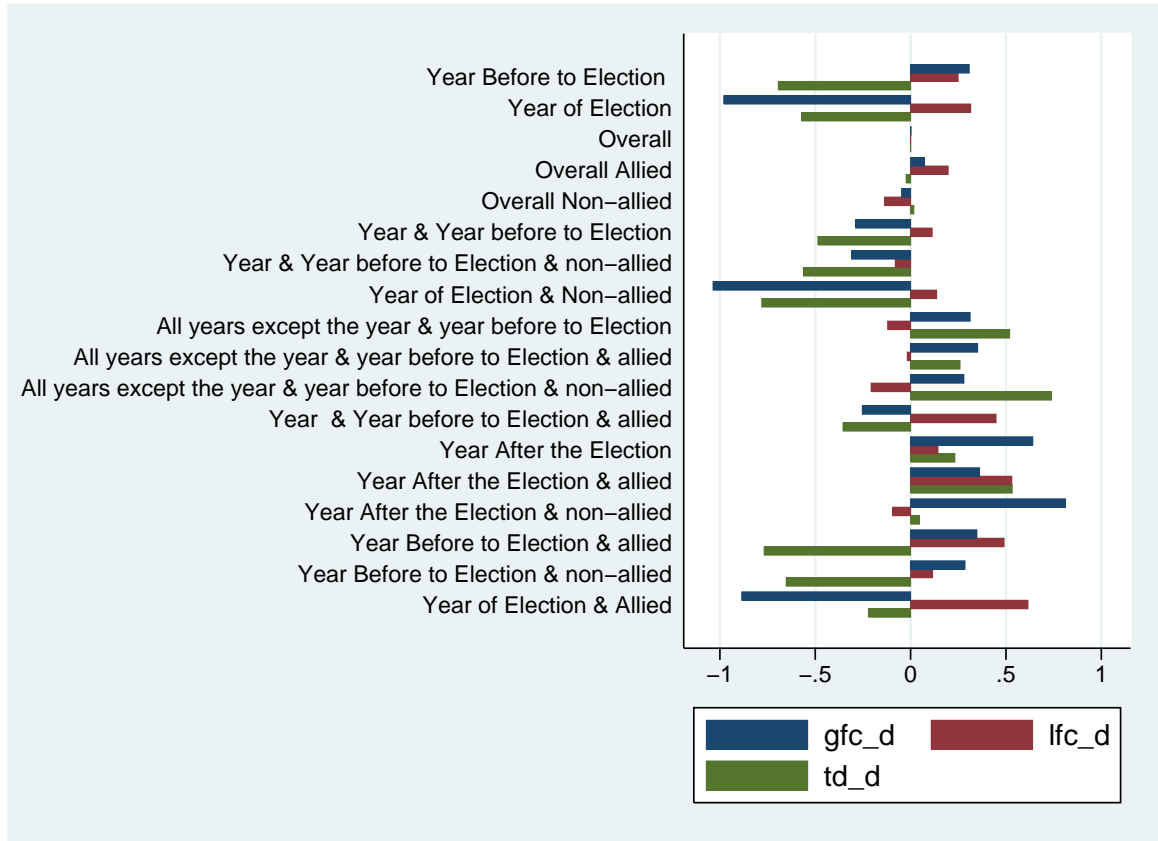
One of the prime motivations underlying this research is the observed announcement of transfer packages by the center to the states prior to and after the elections in the Indian federal structure. [Figure 5.2](#) shows the transfers defined in terms of the level of opportunism for different years (namely, all years, year of election, year before election, year and year before election, year after election, non-election years) in the electoral term of the parliamentary elections. In general, the deviations in the electoral term with respect to Gfc , Lfc and Td hover around zero for all years and states. Notice that, Gfc in most cases deviates negatively in the election years, whereas Td deviates negatively in the year of and year before the election in almost all the cases. However, Gfc deviates positively in the year before the election, more so if the state ruling party is same as the union government or the allied party. The

deviations of Gfc and Td are all positive after the election. In most of the cases Lfc is positively deviated in the year of election or in the year before the election. It appears that the opportunistic manipulations are higher in the case of Lfc . The opportunistic deviations have also been shown in the specific context where the state-level ruling party is an ally of the union government as well as when it is not. Some interesting points to note are - in aggregate, the allied state ruling party gets higher Gfc and Lfc , in general, and in the year before the election, in particular. In fact, a state which is both aligned and swing in the last state election is estimated to receive 16% higher transfers than a state which is non-allied and non-swing (Arulampalam, Dasgupta, Dhillon, and Dutta, 2009), and one-third larger discretionary transfers to aligned municipalities in case of Brazil (Brollo and Nannicini, 2012).

Furthermore, so far, a bulk of the research in this area has focused on advanced economies, and not on developing or emerging countries, particularly for the study of the sub-national level, which is an obvious lacuna. More specifically, the analysis of PBC has been largely attempted for advanced countries, and more so with focus on various fiscal heads of financing the expenditure and collecting revenue through taxes. However, hardly any work pertains to the center-state (federal) transfers, especially for developing economies like India. In this respect, this research fills an important gap in the literature.

This chapter analyzes the central government's politically motivated transfer behavior toward its provinces with the aim to win the election. It is especially interesting to analyze the effect of transfers on the election outcomes in a country where caste and religion based politics and political alignment are frequently used for political gains (Yadav, 1999). In some cases, if religious riots occur in the year preceding the assembly elections, the vote share of the right-wing party in India goes up by 5% - 7% (Iyer and Shrivastava, 2015). However, in the current research, factors such as religion, caste and civil disturbance are not modeled. Instead, the focus is on the center-state transfer variables, with others, namely, gross state domestic product, inflation, parties' years of experience as an incumbent etc., used as control variables.

Figure 5.2: Opportunistic Transfers in the Electoral Term for Parliamentary Elections



Source: Author's calculations.

Figure 5.2 provides an indication of the presence of opportunistic behavior of the ruling party, particularly for the allied parties at the state level. The economic opportunism has been defined as $Opportunistic\ Deviation = [B_{ts} - Mean(B_s)]$, where B_{ts} is the reference year value for a particular year ' t ', in the electoral term ' s ', and $Mean(B_s)$ is the mean of all the values in that electoral term ' s '. The calculation of the mean of ' B_s ' excludes the reference year t^{th} value. Also, if the electoral term is incomplete, we consider the next electoral term including the incomplete period as well. The $Opportunistic\ Manipulation = [B_{yts} - Mean(B_s)]$, where ' s ' is an electoral term and ' yt ' is the year before the election or year of the election value.⁶ It can be seen that the opportunistic transfers are more pronounced for the same ruling party in both the Union and state governments or allied parties than for the

⁶Another way to calculate the opportunistic deviation and manipulation is deviation of reference year values of the fiscal variables from the trend (HP filter values) in the electoral term, which has been exercised by [Aidt, Veiga, and Veiga \(2011\)](#).

non-allied ones in the year of election and one year before the election (Dasgupta, Dhillon, and Dutta, 2004; Arulampalam, Dasgupta, Dhillon, and Dutta, 2009).

In general, fiscal variables in a federal context are expected to follow an expansionary trend before the election. In fact, Figure 5.2 shows such a structure of cycles in case of Gfc and Lfc ; however, it is not so with Td . In fact, Td mostly displays a negative deviation before and during the election and has a positive deviation after the election. The analysis is also extended to look at whether the expansion of transfers in the year prior to the election is higher or lower if the ruling party in the state is an ally of the union government. More specifically, this chapter attempts to analyze whether, in the federal structure, transfers under various heads to the states (for example, Gfc , Lfc and Td) have been operated opportunistically by the central government? Also, whether the opportunistically created transfer cycles impacts the electoral outcome at the Union and the states levels? To find answers to these questions we proceed to look at whether there are specific effects associated with the election years on these transfers? We also analyze whether the opportunistic behavior of the incumbent enhances their chances of re-election?

5.3 The Data and Variables

We utilize a balanced panel of 14 Indian states, excluding the newly created states such as Jharkhand, Chhattisgarh, Uttarakhand and Telangana as well as some additional states where regular elections did not take place, namely, Goa and Jammu and Kashmir.^{7, 8} Also, all North-Eastern states have been dropped from the sample as these are special category states. Being ‘special category’ states they receive grants/transfers on special basis which is very generous from the Union government (Rao and Singh, 2003; Arulampalam, Dasgupta, Dhillon, and Dutta, 2009). Consequently, this

⁷States included in the empirical estimation are - Andhra Pradesh, Bihar, Gujarat, Haryana, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal.

⁸The newly born states such as Jharkhand, Chhattisgarh, Uttarakhand and Telangana are excluded from the sample because of the small data points whereas, Goa and Jammu and Kashmir are excluded because of the infrequent elections.

would not reveal the correct picture in terms of electoral politics. We attempt to test the hypotheses of whether the transfers from the union to the states are politically motivated and whether the political motivation of transfers can help the governments win the election, both at national and state level elections.

The variables that have been considered for the study are:

- *Gfc*: Grants are provided to the states for state and centrally planned and sponsored schemes.
- *Lfc*: Loans are capital receipts of the states either borrowed from the market or from the government. In this case, we will focus the study on loans from the center.
- *Td*: This is state's share in central taxes. Normally, states have to receive the amount equal to their share in the total central taxes in terms of tax devolution.

All these transfer variables have been normalized through dividing by the state level aggregate expenditure. The detailed definition of the variables and data sources have been provided in the Appendix C. As has been explained in the literature review that there are few attempts to study the behavior of the federal transfers where the authors have argued that one cannot deny the possibility of the political motivation behind the center to the states transfers. The basic hypothesis that has been designed are:

- *Gfc* are higher in the year of elections and the year before the election.
- *Lfc* are higher in the year of elections and the year before the election.
- *Td* is normally a formula based transfer and political motivation has been denied for this, hence, it is uniform in the electoral term.

The empirical strategy for the preceding hypothesis has been designed in Section 5.4. After observing the political motivation of transfer for both, the union and the state level elections, we proceed to investigate whether these politically motivated transfers help the government in winning the elections. The basic hypotheses for this research

question are:

- *Gfc* in general and year and year before the election in particular, can help the government in winning elections.
- *Lfc* in general and year and year before the election in particular, can help the government in winning elections.
- Apart from transfer variables, the additional politico-economic factors that can help the government in winning the elections are: if the center and states have the same government, or state government is allied to center, number of years party in power, higher voters turnout and political ideology.

The empirical strategy for these set of hypotheses have been designed in Section 5.5.

5.4 Tracing the Political Transfer Cycles

The testing of the PTC model utilizes the [Pesaran, Shin, and Smith \(1999\)](#) method of pooled mean group (PMG) panel data estimation method where the sample data ranges from 1980-81 to 2010-11. This is one of alternatives for the Generalized Method of Moments (GMM) for which the justification is discussed later in the section.

5.4.1 Method of Estimation

The Ordinary Least Square (OLS) panel data estimation method ignores the individual heterogeneity by keeping the intercept and slope coefficient unchanged for cross sectional (states) units in a random effects model. On the other hand, fixed effects model assumes constant slopes and variance, whereas, the intercept terms are variant across cross sectional units. Also, there is higher loss of degrees of freedom under fixed effects model while controlling for state and time effects through dummy variable ([Baltagi, 2008](#)). Under the two-way fixed effects model, the estimated parameters will be biased if the right hand variables are correlated with the error terms ([Campos](#)

and Kinoshita, 2008). In contrast the random effects model assumes that the error term is not correlated with the right hand independent variables (Arellano, 2003). However, this might not be true in reality. Normally, OLS panel data model assumes common coefficients of the lagged dependent variable (Holly and Raissi, 2009). Also, it does not explain the short and long term relationship considering the cross section and the time dimension of the panel data (Loayza and Ranciere, 2006). Thus, static panel model of random and fixed effects are not suitable for the data.

According to Roodman (2006, 2009), the GMM difference estimators put forth by Arellano and Bond (1991) and system GMM proposed by Arellano and Bover (1995), Blundell and Bond (1998) fit the model well if the number of cross sectional units (N) is larger than the time index (T). In contrast, if T is larger than N , GMM estimators might produce spurious results, either because of the possible error due to the inclusion of lags as the instruments, which might be invalid instruments because of their relationship with the error term. In addition, controlling for the state and time fixed effects create large number of instruments where the Sargan test over-rejects the null hypothesis of exogeneity of instruments. The GMM also ignores the long run relationship of the variables and their stationarity. Also, it is difficult to decide whether the estimated panel data models represent a structural long run equilibrium or a spurious one. Kiviet (1995) argues that, in GMM estimation, assuming a common slope coefficient of the lagged dependent variable could lead to further bias. Hence, GMM might not be a reliable method in this case.

Based on the estimation concept by Klomp and De Haan (2013a,b), we try to capture the political transfer cycle by using the method suggested by Pesaran, Shin, and Smith (1999), Loayza and Ranciere (2006) and Samargandi, Fidrmuc, and Ghosh (2015). Pesaran, Shin, and Smith (1999) provide the short and long term relationships between variables using a dynamic heterogeneous panel data error-correction estimation utilizing an auto-regressive distributed lag (ARDL) model, where p is the lag of the dependent variable and q is the lag of the independent variables. To maintain enough degrees of freedom with the given 14 cross sections for 31 years data, we

take $p = 1$ and $q = 1$. Following [Loayza and Ranciere \(2006\)](#), the structure of the equation is postulated as:

$$\begin{aligned} \Delta TR_{i,t} = & \sum_{j=1}^{p-1} \pi_j^i \Delta TR_{i,t-j} + \sum_{j=0}^{q-1} \delta_j^i \Delta X_{i,t-j} \\ & + \phi^i [TR_{i,t-1} - \{\beta_i^0 + \beta_i^1 X_{i,t-1} + \beta_i^2 Elect_{i,t-1} + \beta_i^3 Z_{i,t-1}\}] + v_{it}, \end{aligned} \quad (5.1)$$

and

$$TR_{i,t} = \beta_i^0 + \beta_i^1 X_{i,t} + \beta_i^2 Elect_{i,t} + \beta_i^3 Z_{i,t} + \epsilon_{it}. \quad (5.2)$$

where, $\epsilon_{i,t} \sim I(0)$ and $\epsilon_{i,t-1} = TR_{i,t} - \{\beta_i^0 + \beta_i^1 X_{i,t-1} + \beta_i^2 Elect_{i,t-1} + \beta_i^3 Z_{i,t-1}\}$, is the lag of the error term $\epsilon_{i,t}$. The $v_{i,t}$ and $\epsilon_{i,t}$ are the error terms of eqs. (5.1) and (5.2) respectively. The $TR_{i,t}$, is the transfer variable for the i^{th} state at time t , and it could be any of the following variables: *Gfc*, *Lfc*, and *Td*. The variables $\Delta TR_{i,t-j}$, where $j = 1, 2, \dots, p-1$ are the first differences of the lagged dependent variables. The X_{it} is the set of following variables - the density of population (*Density*), number of years party is in power (*Nypp*), difference between per capita income of the country and the states (*Dpci*).

The corresponding expected signs for *Density* and *Nypp* are positive, because a more densely populated states requires more transfers on account of a higher need for public investment ([Arulampalam, Dasgupta, Dhillon, and Dutta, 2009](#)), and, more experienced is the party in power, higher is the transfer. The gap between the per capita income of the union and the states (*Dpci*) is one of the criteria for center-state transfers. The principle is that the union government will transfer higher resources to a state if the state has a lower per capita income as compared to the national average. Hence, the expected sign for *Dpci* is negative. That is, lower is the per capita income of the state in comparison with the national average, larger will be the transfer.

The *Elect* is a set of election year variables which consist of two dummy variables: year before the election (*Yr_bf_Elect*) and year of the election (*Yr_Elect*). The variable is defined in a binary form as $Yr_bf_Elect=1$, if it is the year before the election and 0, otherwise. Similarly, $Yr_Elect=1$, if it is the year of the election and 0, oth-

erwise. The corresponding expected signs for both the coefficients of *Yr_bf_Elect* and *Yr_Elect* are positive. This implies that, the year prior to election is expected to have higher transfers to the states so that the state level (both the parliamentary and assembly) election results could be influenced opportunistically. A similar postulation is done for *Yr_Elect*. Further, *Z* is another set of dummy variables that includes *Pidum*, *Pidum*Yr_bf_Elect*, *Pidum*Yr_Elect*, *Allied* and *Cldum*. The political ideology, *Pidum*=1, if the ruling party is of the right-wing type and 0, otherwise for the national elections. In the case of assembly elections, the political ideology has been ranked from ‘1’ to ‘5’ where, ‘1’ represents the extreme right and ‘5’ is the extreme left party ideology (refer to Table 4.2 for detail classification of the ideologies).⁹ The binary, *Allied*=1, if the party in the state and center are same or the state ruling party is allied to the center and it is 0, otherwise. The coalition binary *Cldum*=1, if the center is a coalition government, and 0, otherwise (similar definition but separate dummy has been used for coalition state government). If the coalition government at the center and state ruling party is an ally then it is expressed as *Clal_dum*=1, and 0, otherwise.

Veiga and Veiga (2007) and Aidt, Veiga, and Veiga (2011) find that right-wing Portuguese mayors are less opportunist than the left-wing ones. Similar results have been found by Mourão and Veiga (2010) for a panel of 68 countries for 40 years. Van der Brug, Van der Eijk, and Franklin (2007) argued that, being more opportunist, a left-wing government aims more at reducing unemployment, while a right-wing government, being less opportunist, worries more about inflation. In our case, we do not start with a prior for *Pidum*. If the center and states are ruled by the same party or are allied with each other, states can garner more resources from the center and, hence, the expected sign for the coefficient of *Allied* is positive (Arulampalam, Dasgupta, Dhillon, and Dutta, 2009; Brollo and Nannicini, 2012). A coalition govern-

⁹In this analysis, Bhartiya Janata Party (BJP) or national democratic alliance (NDA) has been considered as the right-wing party as this party is pro economic liberalism which is noted as the binary ‘1’ and ‘0’ to rest of the parties. Since at the Union level the Indian National Congress (INC) has ruled for most of the time and also pro economic liberalism but also follow many other ideologies such as - populism, social democracy etc. In total, INC can be termed as the centrist party. In case of assembly elections political ideology has been ranked from 1 (right) to 5 (left).

ment is considered to be weak because of its excessive dependence on state/ regional parties and, hence, in general the transfers will be less, and Cl_{dum} is expected to have a negative sign but Cl_{al_dum} (coalition partner) is expected to have a positive sign as the aligned parties have to be constantly satisfied by the central coalition government to avoid the fall of the government. The β 's are the long run coefficients and ϕ is the speed of adjustment (error correction coefficient) to the long run equilibrium. The subscripts i and t denote state and time indices respectively. The square bracket term in the right hand side of eq. (5.1) yields the long run transfers regression equation derived from eq. (5.2).

In fact, eq. (5.1) can be estimated by three different methods: (i) mean group (MG) model of Pesaran and Smith (1995), (ii) pooled mean group (PMG) estimators developed by Pesaran, Shin, and Smith (1999), and (iii) dynamic fixed effect (DFE). Pesaran and Smith (1995), Pesaran (1997), and Pesaran and Shin (1998) propose the ARDL model, including the error correction term in a cointegration model. Unlike, the cointegration models by Johansen (1995) and Phillips and Hansen (1990), which requires the same order of integration for the estimation and interpretation of the long run relationship, the ARDL model by Pesaran and Shin (1998) confirms that it can be used irrespective of the variables being $I(0)$ or $I(1)$ or any combination of the two. Thus, in our model, we are not estimating the unit root test of the variables. This model provides consistent and efficient short and long term relationships among the variables simultaneously. However, even if the estimators are consistent and efficient, we cannot ignore the endogeneity bias because of the presence of lag dependent variables in the right hand side.

In our case, PMG model seems to be more appropriate because of the following reasons: (i) it gives both short and long run coefficients simultaneously, which makes the analysis more comprehensive, and it also provides the speed of adjustment to the long run equilibrium, (ii) the variance of the error term is different for states but the long run slope coefficients are common across states. That is, it postulates that the short run characteristics can be different across states, but these are not different in

the long run. Some basic requirements for estimation validity of the PMG model are as follows: (i) for a consistent, efficient and stable PMG model in the long run, the sign of the coefficient of error correction term should be negative and not less than ‘-2’. (ii) the error term of the ARDL model should be uncorrelated with the explanatory variables (clear exogeneity), and (iii) the number of the cross sectional units should be large enough, or such that $N < T$. In the absence of these conditions, PMG model will not give efficient results (Samargandi, Fidrmuc, and Ghosh, 2015). In our model all these conditions are satisfied.

Pesaran and Smith (1995), propose Mean Group (MG) estimators which yields heterogeneous long and short run coefficients for each cross sectional units as the unweighted means of the estimated coefficients. One of the very important requirements for the MG model is that the number of cross sectional units should be large enough (or at least 20-30). In our case we are taking only 14 states and find this model to be unsuitable.

The DFE model is similar as the PMG estimators, in that, it is based on constant slope coefficients and homoscedastic error variances across states in the long run. It differs from PMG as it puts further restrictions of cohesion of the short run coefficients and speed of adjustment. The DFE model also has the endogeneity bias due to the presence of lagged dependent variables. Hence, we proceed with the use of PMG model and not MG or DFE models for our analysis.

In accordance with eq. (5.1), the two equations that have been estimated to capture the transfer cycles are as follows:

$$\Delta TR_{i,t} = \sum_{j=1}^{p-1} \pi_j^i \Delta TR_{i,t-j} + \sum_{j=0}^{q-1} \delta_j^i \Delta X_{i,t-j} + \phi^i [TR_{i,t-1} - \{\beta_i^0 + \beta_i^1 X_{i,t-1} + \beta_i^3 Z_{i,t-1}\}] + \mu_{it}, \quad (5.3)$$

$$\Delta TR_{i,t} = \sum_{j=1}^{p-1} \pi_j^i \Delta TR_{i,t-j} + \sum_{j=0}^{q-1} \delta_j^i \Delta X_{i,t-j} + \phi^i [TR_{i,t-1} - \{\beta_i^0 + \beta_i^1 X_{i,t-1} + \beta_i^2 Elect_{i,t-1} + \beta_i^3 Z_{i,t-1}\}] + \nu_{it}. \quad (5.4)$$

The errors are respectively captured by μ_{it} and v_{it} in eqs. (5.3) and (5.4). Notably, PTC has been captured by the difference between the estimated error correction values (that we get for all the states and years) of eq. (5.3) without the election dummy variables (pertaining to both, year before the election and year of the election) and the error correction values of eq. (5.4) when the election dummy variables are included in it. That is, we trace PTC as $\hat{\mu}_{it} - \hat{v}_{it}$. Since, the election variables are not included in eq. (5.3), the error correction values will be higher as compared to eq. (5.4) values when the election variables are included, and correspondingly the gap will capture the cycles. These equations have been estimated for both, the parliamentary and assembly elections. The patterns of state-wise transfer cycles are shown in the diagrams included in Appendix C.

5.4.2 Baseline Results

Table 5.1 presents the basic descriptive statistics for all the transfer variables defined in levels as well as in terms of opportunistic deviation/ manipulation form. The section also presents the basic statistics for the additional variables, namely, *Allied*, *Cldum* and *Clal_dum*, *Pidum*, *Nypp*, *NGDP* growth rates, Inflation (*Inf_i* for all India inflation rate and *Inf_s* for state level inflation and *Density*). The full sample respective mean of the *Gfc*, *Lfc* and *Td* are: 9.79, 10.10 and 16.14. The average values for *Lfc* shows higher levels in the year before and the year of the parliamentary election, whereas, *Gfc* and *Td* are higher in the year before the parliamentary election and all *Gfc*, *Lfc* and *Td* are higher in the year before the assembly elections. In terms of opportunistic manipulations, *Gfc* and *Lfc* are positively deviated in the year before but not in the year of the parliamentary elections. However, notice that, *Gfc* and *Td* are positively deviated in both, the year before and the year of the assembly elections. The possible reason for higher *Td* in the year before the election can be because of the coincident execution of the constitutional provision.

Further, around 41% of the time center and state have the same government, or state government is an ally whereas, respectively around 71% and 41% of the time the

Table 5.1: Basic Statistical Information

Variables	National Level Election				State Level Election			
	Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max
<i>Gfc</i>	9.79	4.36	2.82	27.37	9.79	4.36	2.82	27.37
<i>Lfc</i>	10.10	6.79	0.01	39.08	10.10	6.79	0.01	39.08
<i>Td</i>	16.14	8.31	3.71	53.10	16.13	8.31	3.71	53.10
<i>Gfc (Yr_bf_Elect)</i>	9.46	4.54	2.82	23.37	10.17	4.52	3.42	23.21
<i>Lfc (Yr_bf_Elect)</i>	11.73	7.14	0.02	39.08	9.44	6.32	0.07	36.50
<i>Td (Yr_bf_Elect)</i>	15.55	7.73	3.71	39.88	16.71	8.71	3.89	50.54
<i>Gfc (Yr_Elect)</i>	8.96	4.09	2.86	22.23	9.95	4.42	3.09	22.23
<i>Lfc (Yr_Elect)</i>	10.77	6.33	0.31	35.45	10.25	6.68	0.01	35.45
<i>Td (Yr_Elect)</i>	15.55	7.57	4.29	45.48	16.37	8.51	3.74	50.54
<i>OM of Gfc (Yr_bf_Elect)</i>	0.07	2.22	-7.11	8.50	0.22	2.29	-7.24	5.73
<i>OM of Lfc (Yr_bf_Elect)</i>	0.94	4.09	-15.52	20.02	-0.33	3.35	-14.50	15.27
<i>OM of Td (Yr_bf_Elect)</i>	-0.23	2.53	-7.77	8.59	0.17	2.99	-13.54	9.36
<i>OM of Gfc (Yr_Elect)</i>	-0.61	2.44	-8.71	5.12	0.31	2.33	-5.57	5.34
<i>OM of Lfc (Yr_Elect)</i>	-0.86	4.43	-22.57	14.95	-0.82	3.73	-11.69	13.96
<i>OM if Td (Yr_Elect)</i>	-0.39	2.60	-12.10	11.16	0.10	2.31	-4.98	7.05
<i>Turnout</i>	60.77	9.82	23.96	82.66	63.42	9.87	23.82	82.94
<i>Allied</i>	0.41	0.49	0.00	1.00	0.41	0.49	0.00	1.00
<i>Cldum</i>	0.71	0.45	0.00	1.00	0.41	0.49	0.00	1.00
<i>Clal_dum</i>	0.23	0.42	0.00	1.00	0.23	0.42	0.00	1.00
<i>Pidum</i>	0.19	0.39	0.00	1.00	2.73	1.11	0.00	5.00
<i>Nypp</i>	27.86	16.40	0.00	48.00	19.98	14.28	1.00	55.00
<i>Gfc if Allied=1</i>	9.87	4.28	2.95	27.37	9.87	4.28	2.95	27.37
<i>Lfc if Allied=1</i>	10.75	6.09	0.11	29.35	10.75	6.05	0.11	29.35
<i>Td if Allied=1</i>	14.49	6.16	3.71	29.48	14.50	6.16	3.71	29.48
<i>Gfc if Pidum=1</i>	7.32	2.89	2.82	16.95	10.34	4.01	3.43	18.41
<i>Lfc if Pidum=1</i>	7.94	5.12	1.76	31.50	7.79	4.64	0.31	16.81
<i>Td if Pidum=1</i>	14.33	8.67	3.71	41.48	14.87	5.75	5.06	32.09
<i>Gfc if Cldum=1</i>	9.57	4.35	2.82	23.21	9.77	4.24	3.18	23.20
<i>Lfc if Cldum=1</i>	8.04	6.16	0.01	35.03	8.56	6.16	0.01	39.08
<i>Td if Cldum=1</i>	16.32	9.18	3.71	53.10	16.52	8.80	3.71	53.10
<i>NGDP Growth Rate</i>	14.36	3.09	7.67	19.51	14.48	7.07	-27.89	42.53
<i>Inflation</i>	7.23	3.25	3.27	18.20	7.36	4.84	-3.32	53.06
<i>Density</i>	424	245	100	1024	424	245	100	1024

Note: *Pidum* for the national election is binary (=1 if right, 0 otherwise) and ranking for the state election (1 to 5 correspondingly ranked from extreme right to extreme left). *OM* is Opportunistic Manipulations.

union and the states' are ruled by the coalition government. In the post-1980 period, India has been mostly governed by a coalition government, which has frequently been a left-of-the-center one. That is, the central government has been ruled by the center-left by 80% of the time and remaining 20% by the right-wing ones. Similarly, at the state level, the governments are mostly ruled by the centrist parties. Observably, in general, the right-wing government tends to provide less transfer in terms of Gfc and Lfc as compared to the center-left one for the union government whereas, at the state level former has the higher Gfc . Also, notice that the state level nominal GDP growth and inflation rates are higher than the national level.

Tables 5.2 and 5.3 respectively show the regression results for the parliamentary and the assembly elections. An opportunist incumbent is expected to expand the transfer before the election and induce a downturn in it in the post election period. A higher opportunistic manipulation is possible in case of Gfc and Lfc as there is a greater scope for the role of the Planning Commission (now NITI Aayog) and the Union ministries. However, in the case of parliamentary elections, the year before the elections Gfc is not found to be important; this is opposite in sign and not significant but, if year of the elections is controlled, then it yields a positive coefficient for the year before the election, but it is again not significant. Lfc displays a positive and significant result in the year before the election (also supported by Klomp and De Haan, 2013b; Chortareas, Logothetis, and Papandreou, 2016, and Aidt, Veiga, and Veiga, 2011), but not in the year of the election. Td is decided by the FC, which is constitutionally an independent body and, hence, political opportunism is less pronounced in this case. In fact, Td is lower in the year before the election as well as in the year of the election. In the year of the election, Lfc is positive and insignificant but, Gfc and Td are negative and significant. Interestingly, since a loan entails a liability to be repaid back to the center, the central government seems to woo the state government, as well as the voters, prior to the election, providing more loans to the state and, thus, also transferring the burden, which is not immediately noticed by the voters. Thus, for the parliamentary elections, there exists a strong PTC in Lfc in the year before the election, whereas, in the year of election, Lfc is positive but not significant.

Table 5.2: Dependent Variables are *Gfc*, *Lfc* and *Td* (Parliamentary Elections)

Variables	Gfc			Lfc			Td		
	PMG	PMG	PMG	PMG	PMG	PMG	PMG	PMG	PMG
(A) Long Run Coefficients									
<i>Yr_bf_Elect</i>	-0.290 (0.336)	0.424 (0.373)	—	2.651 (0.605)***	1.963 (0.653)***	—	-1.417 (0.356)***	-1.058 (0.379)***	—
<i>Yr_Elect</i>	-1.209 (0.368)***	—	-1.222 (0.417)***	-0.714 (0.647)	—	0.989 (0.962)	-1.004 (0.354)**	—	-0.317 (0.324)
<i>Density</i>	0.001 (0.005)	-0.0002 (0.004)	-0.005 (0.005)	-0.048 (0.007)***	-0.060 (0.006)***	-0.055 (0.007)***	-0.001 (0.004)	-0.003 (0.004)	-0.010 (0.003)***
<i>Nypp</i>	0.009 (0.021)	0.041 (0.011)***	0.051 (0.012)***	-0.002 (0.037)	0.057 (0.022)***	0.008 (0.021)	0.075 (0.018)***	0.115 (0.012)***	0.107 (0.010)
<i>Dpci</i>	-0.0001 (0.00003)***	-0.0001 (0.00003)***	-0.0001 (0.00003)***	0.0002 (0.00005)***	0.0003 (0.00005)***	0.0003 (0.00005)***	0.0001 (0.00003)***	0.0001 (0.00003)***	0.0001 (0.00003)***
<i>Pidum</i>	-1.627 (0.773)**	—	—	-1.740 (1.345)	—	—	-1.827 (0.705)*	—	—
<i>Pidum*Yr_bf_Elect</i>	—	-1.916 (0.771)**	—	—	2.441 (1.368)*	—	—	-1.298 (0.732)*	—
<i>Pidum*Yr_Elect</i>	—	—	1.226 (0.863)***	—	—	-4.343 (1.635)***	—	—	-0.579 (0.677)
<i>Allied</i>	0.861 (0.336)***	0.808 (0.339)**	0.589 (0.343)*	0.759 (0.592)	0.348 (0.616)	0.489 (0.642)	-0.601 (0.322)*	-0.570 (0.334)*	-0.181 (0.294)
<i>Cldum</i>	-1.143 (0.515)**	-1.525 (0.517)***	-1.052 (0.534)**	-1.132 (0.869)	-0.292 (0.868)	-0.632 (0.889)	1.226 (0.477)***	1.089 (0.482)**	1.495 (0.432)***
(B) Short Run Coefficients									
<i>Error Correction Term</i>	-0.521 (0.066)***	-0.511 (0.062)***	-0.495 (0.059)***	-0.454 (0.044)***	-0.429 (0.040)***	-0.409 (0.039)***	-0.551 (0.059)***	-0.547 (0.058)***	-0.577 (0.073)***
Δ <i>Density</i>	-0.198 (0.064)***	-0.266 (0.064)***	-0.249 (0.063)***	0.004 (0.067)	-0.039 (0.072)	-0.001 (0.075)	-0.357 (0.156)**	-0.424 (0.161)***	-0.403 (0.161)**
Δ <i>Nypp</i>	0.017 (0.009)*	0.011 (0.009)	0.020 (0.009)**	-0.041 (0.010)***	-0.041 (0.010)***	-0.055 (0.010)***	-0.029 (0.008)***	-0.037 (0.009)***	-0.030 (0.009)***
Δ <i>Dpci</i>	0.0002 (0.00003)***	0.0002 (0.00003)***	0.0002 (0.00003)***	-0.0002 (0.0001)*	-0.0002 (0.0001)*	-0.0002 (0.0001)*	0.00005 (0.00004)	0.00004 (0.00004)	0.00006 (0.00005)
<i>Intercept</i>	5.720 (0.667)***	5.715 (0.623)***	6.403 (0.642)***	15.039 (2.557)***	15.917 (2.866)***	14.755 (2.545)***	10.246 (1.839)***	10.047 (1.816)***	11.656 (2.182)***
<i>Observation</i>	420	420	420	420	420	420	420	420	420
<i>No. of States</i>	14	14	14	14	14	14	14	14	14

***, **, * Significant at 1%, 5% and 10% respectively (standard errors in parentheses).

The results are slightly different in the case of assembly elections (Table 5.3). That is, Gfc is positive but insignificant in both, the year before the election and the year of the election. Lfc is negative in the year before the election but positive and significant in the year of election. Td is mostly negative in the election year. A PTC can be seen more clearly only in case of Lfc in the year of the assembly election. Clearly, it seems that the PTC is more pronounced in the case of parliamentary election and not in the assembly election. Moreover, the results for remaining variables such as political ideology, experience and form of the government provide similar conclusion for both, the parliamentary and assembly elections. This has been presented in Tables 5.2 and 5.3 and analyzed in the following subsection.

5.4.3 Political Ideology, Experience and Form of the Government

This section analyzes the behavior of the three transfers - Gfc , Lfc and Td in relation to the following variables: $Density$, $Nypp$ and $Dpci$ contained in X_{it} . The additional control variable Z_{it} consists of dummy variables: $Pidum$ and its interactions with the year before the election and year of election, $Allied$ and $Cldum$. Contrary to our expectation, the coefficient of $Density$ is negative and significant across the transfer variables, both in short and the long runs. In fact, a higher population share in the aggregate is one of the criteria for higher grants and devolution to the states (60% weight is given to the population of the states according to the Gadgil-Mukherjee Formula, 1991).¹⁰ However, a higher population share state is not always a high population density one. High density states have already advanced in terms of infrastructure and employment opportunity and have higher level of urbanization and

¹⁰<http://www.pbplanning.gov.in/pdf/gadgil.pdf>. This formula for allocation of central assistance is called Gadgil-Mukherjee Formula-1991. The main features are - (I) From the total Central assistance, set apart funds required for externally aided schemes (II) From the balance, provide reasonable amounts for Special Area Programmes viz. (i) Hill Areas;(ii) Tribal Areas;(iii) Border Areas; (iv)N.E.C. (v) Other Programmes (III) From the balance, give 30% to the Special Category States. (IV) Distribute the balance among the non-Special Category States as per the following criteria and weights - (a) Population (1971) - 60% (b) Per Capita Income -25% [deviation' method-covering states with per capita SDP below the national average (20%) and Distance method-covering all states (5%)] (c) Performance (Tax Effort, Fiscal Management and Progress in respect of National objective) - 7.5% (d) Special Problems - 7.5%.

industrialization, hence, the transfers operated are lower and significant. Further, a more experienced (higher $Nypp$) government is expected to provide higher transfers from the center, and this is found to be true in case of all: Gfc , Lfc and Td in the long run, but not necessarily true in the short run as it is positive and significant only in the case of Gfc and not Lfc and Td . In case of the variable $Dpci$, higher the fall in the states' per capita income below the national average, larger is the transfers received in terms of Gfc but not in terms of Lfc in the long run. However, in the short run this gets reversed. That is, a fall in a state's per capita income below the national average entails a lower Gfc but a higher Lfc in the short run. The short and long run effects of $Dpci$ are always positive but not significant in the case of Td .

The component Z_{it} consists of $Pidum$ and its interaction with the year before the election and the year of election, $Allied$, $Cldum$ and $Clal_dum$. The $Clal_dum$ has been dropped from the regression results because of the multi-collinearity problem. The right-wing ($Pidum=1$) government exhibits the tendency to transfer less to the states in terms of Gfc , Lfc and Td in both parliamentary and assembly elections. The right-wing government ($Pidum=1$) is significant for Gfc and Td in case of parliamentary election, but only for Td in assembly election. Also, the right-wing government provides more Lfc in the year before the parliamentary and assembly elections but less Gfc and Td . That is, right-wing is more opportunistic in term of Lfc but center-left displays higher opportunism in terms of Gfc and rule based Td . However, the opposite happens in the parliamentary and assembly year of the elections.

In general, for both parliamentary and assembly elections, the states run by the same party as the center or the allied parties ($Allied$) in the states tend to get more grants and loans, this is true and significant in the case of Gfc and Lfc in both parliamentary and assembly elections. This is confirmed from the results in [Dasgupta, Dhillon, and Dutta \(2004\)](#) and [Arulampalam, Dasgupta, Dhillon, and Dutta \(2009\)](#) as well. The coalition ($Cldum=1$) government operates lower transfers in terms of Gfc and Lfc but higher Td . Also, if the state ruling party is a coalition ally of the union government, then allied has to be happier with the regular flow of resources for the

smooth functioning of the union government. If the interest of these regional players is not taken care of, there is the fear of withdrawal of support from the government by the allied parties, which poses a political constraint.

As in the earlier literature on PBC in the form of opportunistic budgetary expansion as in [Drazen and Eslava \(2010\)](#), [Aidt, Veiga, and Veiga \(2011\)](#), [Klomp and De Haan \(2013b\)](#), and [Chortareas, Logothetis, and Papandreou \(2016\)](#), we confirm a higher Lfc in the year before the election (Table 5.2 and 5.3) and slightly lower one in Gfc and no cycles in Td . Since loans have to be repaid back, it is easier for the union government to extend higher loans to the states before the election. Even when Gfc is operated as per the FC's recommendations, interestingly, some components of Gfc are determined by the Planning Commission as well as the central ministries.

In sum, we can conclude that, center-state transfers display a PTC in terms of Lfc , relatively less in Gfc but not at all in case of Td . The error correction terms are negative and significant in all the cases and well under the threshold value of '-2', implying stability of the model. This shows that the ARDL equations are stable in the long run. Also, intercepts are positive and highly significant in all the cases in case of both parliamentary and assembly elections.

The resultant graphs of the transfer cycles are shown in Figures C.1 and C.2 (C.2a and C.2b) for parliamentary election and Figures C.3 and C.4 (C.4a and C.4b) for assembly elections in Appendix C. The graphs display a pattern similar to what the empirical results suggest. That is, we have a strong electoral cycle for Lfc in the year before and the year of the election respectively in parliamentary and assembly level elections, and comparatively less pronounced cycles in Gfc in the year before the assembly elections but not in the year of elections. There is no clear cycle observed in the case of Td in both case of parliamentary and assembly elections.

Table 5.3: Dependent Variables are *Gfc*, *Lfc* and *Td* (Assembly Elections)

Variables	Gfc			Lfc			Td		
	PMG	PMG	PMG	PMG	PMG	PMG	PMG	PMG	PMG
(A) Long Run Coefficients									
<i>Yr_bf_Elect</i>	0.214 (0.388)	0.143 (0.404)	—	-0.814 (0.648)	-1.095 (0.682)*	—	-0.237 (0.311)	0.024 (0.339)	—
<i>Yr_Elect</i>	0.190 (0.384)	—	-0.099 (0.404)	0.170 (0.653)	—	1.704 (0.716)**	-0.518 (0.305)*	—	-0.571 (0.347)*
<i>Density</i>	0.001 (0.005)	-0.002 (0.004)	-0.004 (0.005)	-0.056 (0.008)***	-0.063 (0.007)***	-0.054 (0.007)***	-0.006 (0.003)**	-0.010 (0.003)***	-0.010 (0.003)***
<i>Nypp</i>	0.029 (0.020)	0.051 (0.011)***	0.055 (0.011)***	0.006 (0.035)	0.038 (0.019)**	0.003 (0.020)	0.067 (0.016)***	0.107 (0.010)***	0.112 (0.010)***
<i>Dpci</i>	-0.0001 (0.00003)***	-0.0001 (0.00003)***	-0.0001 (0.00003)***	0.0003 (0.00005)***	0.0003 (0.00005)***	0.0002 (0.00005)***	0.00007 (0.00002)***	0.0001 (0.00003)***	0.0001 (0.00002)***
<i>Pidum</i>	-1.027 (0.763)	—	—	-1.167 (1.294)	—	—	-1.546 (0.600)***	—	—
<i>Pidum*Yr_bf_Elect</i>	—	-1.916 (0.771)**	—	—	1.170 (1.386)*	—	—	-0.337 (0.716)*	—
<i>Pidum*Yr_Elect</i>	—	—	1.358 (0.926)	—	—	-5.320 (1.710)***	—	—	0.140 (0.765)
<i>Allied</i>	0.724 (0.337)**	0.245 (0.864)**	0.639 (0.332)*	0.074 (0.603)	-0.251 (0.585)	0.369 (0.602)	-0.044 (0.277)	-0.084 (0.284)	-0.204 (0.292)
<i>Cldum</i>	-1.595 (0.531)***	0.653 (0.333)***	-1.367 (0.515)***	-0.221 (0.828)	0.073 (0.798)*	-0.742 (0.826)	0.875 (0.406)**	1.341 (0.411)***	1.449 (0.421)***
(B) Short Run Coefficients									
<i>Error Correction Term</i>	-0.518 (0.063)***	-0.508 (0.063)***	-0.502 (0.063)***	-0.430 (0.043)***	-0.420 (0.044)***	-0.431 (0.041)***	-0.596 (0.068)***	-0.587 (0.073)***	-0.581 (0.073)***
Δ <i>Density</i>	-0.274 (0.065)***	-0.284 (0.064)***	-0.287 (0.066)***	-0.023 (0.085)	-0.055 (0.088)	0.008 (0.075)	-0.405 (0.167)**	-0.435 (0.164)***	-0.439 (0.170)**
Δ <i>Nypp</i>	0.015 (0.009)*	0.015 (0.009)*	0.015 (0.009)*	-0.047 (0.010)***	-0.048 (0.010)***	-0.046 (0.010)***	-0.024 (0.009)***	-0.029 (0.009)***	-0.029 (0.009)***
Δ <i>Dpci</i>	0.0002 (0.00003)***	0.0002 (0.00003)***	0.0002 (0.00003)***	-0.0002 (0.0001)*	-0.0002 (0.0001)*	-0.0002 (0.0001)*	0.00005 (0.00006)	0.00006 (0.00004)	0.00005 (0.00004)
<i>Intercept</i>	5.645 (0.614)***	6.061 (0.595)***	6.221 (0.614)***	16.195 (2.770)***	16.757 (2.897)***	15.335 (2.493)***	11.846 (1.986)***	12.030 (2.223)***	11.918 (2.218)***
<i>Observation</i>	420	420	420	420	420	420	420	420	420
<i>No. of States</i>	14	14	14	14	14	14	14	14	14

***, **, * Significant at 1%, 5% and 10% respectively (standard errors in parentheses).

Once the transfer cycles are traced, an immediate question that arises is: whether the opportunistic transfer cycles created by the government at the union and state levels help win the parliamentary and assembly elections? That is, since the pre-electoral cycles have been created in the case of *Gfc* and *Lfc*, the specific question is whether these pre-electoral opportunistic cycles help the incumbent win the election? The following section attempts to find an answer to these questions.

5.5 Effect of Transfers on Electoral Outcome

To analyze at the re-election prospects that could be ascribed to opportunistic manipulations of transfers by the central government, first, we examine the parliamentary election based on state level results and secondly, the assembly elections. In both the cases, we rely on a state-level analysis. Using the same data set as in the previous section but for 14 major states, covering the parliamentary as well as the assembly elections in India, spanning the period *1980-81* to *2010-11*, we attempt to estimate the equation of electoral outcome. We take different transfer variants as the independent variable, along with other binary and exogenous variables. The binary variable of victory has been defined state-wise in the following manner:

$$V = \begin{cases} 1, & \text{if } V^* = \frac{\text{Seats Won by Incumbent} - \text{Seats Won by Opponent}}{\text{Total Parliamentary Seats at the State}} > 0 \\ 0, & \text{otherwise} \end{cases} \quad (5.5)$$

where, V is the limited dependent variable termed as victory, where, $V = 1$, if $V^* > 0$ (retaining the power) and 0, otherwise. That is, V takes the value 1, if the ratio of the difference between the number of seats won by incumbent and seats won by the opponent and the total number of parliamentary seats (assembly seats in the case of state level elections) in the state is greater than 0 and takes the value 0, otherwise. If the variable V^* is positive then, the results show the minimum threshold for majority to form the government.¹¹ For the parliamentary elections, the incumbent is the

¹¹The victory of a politician in an election in India decided by the method of ‘first-past-the-post’. That is, candidates with plurality of votes is the winner of an election in a constituency.

central government, whereas, state government is considered as the incumbent for the assembly elections.

5.5.1 Method of Estimation

We now employ the fixed effects Logit model for the panel data set for the 14 states. The econometric equation for the fixed effect model can be specified as, $V_{it}^* = X'_{it}\beta + \delta_t + \theta_i + \varepsilon_{it}$, with

$$Pr[V_{it} = 1|X_{it}, \delta_t, \theta_i] = Pr[V_{it}^* > 0] = Pr[\varepsilon_{it} > -X'_{it}\beta - \delta_t - \theta_i] = F(X'_{it}\beta + \delta_t + \theta_i) \quad (5.6)$$

where, F is the standard logistics distribution function, V_{it} is the binary outcome as the dependent variable (victory), which takes a value of 1 if the incumbent party has the state level majority (re-elected) and 0, otherwise. In general, state level unobserved characteristics such as caste, religion, gender, genetic inheritance, intelligence etc., can affect the binary of victory and other independent variables. Accordingly, the correlation between the unobserved characteristics of the states and explanatory variables are not zero. Thus, considering the importance of the time invariant features of the states, the fixed effects models are useful in this case. Often, failing to capture the fixed effects of the time and states fixed effects conclude the spurious causal relationship. Hence, for our purposes of investigating whether transfers help win the elections; we capture both the time and state fixed effects. The estimable form of the Logit model is as follows:

$$\begin{aligned} V_{it} = & \Gamma_0 TR_{it} + \Gamma_1 (TR_{it} * EL) + \Gamma_2 (\Delta TR_{it} * EL) + \Gamma_3 ECO_{it} + \Gamma_4 POL_{it} + \\ & \Gamma_5 Pol_dum_{it} + \delta_t + \theta_i + \varepsilon_{it}, \end{aligned} \quad (5.7)$$

where, $i = 1, 2, 3, \dots, 14$, indicates the index of states for variables (Gfc , Lfc and Td) and t indicate the times series in years. The equation includes both, the time (δ_t) and state fixed effects (θ_i) and random variable is ε_{it} , which is assumed as $E(\varepsilon_{it})=0$. Our prime objective is to estimate the equation for electoral outcome V_{it} .

The vector of variables, TR_{it} , has been used to denote Gfc , Lfc and Td , each as a separate equation, and their respective coefficients in the corresponding equations will be represented by Γ_0 and expected to be positive in each case. The vector $TR_{it} * EL$ refers to the interaction term of the transfer and the election variables (year before the election and year of election) variables. These interaction terms are expected to be positively affecting the winning probability of the government. Similarly, the vector $\Delta TR_{it} * EL$ consists of the interaction terms of the transfer (in opportunistic manipulation form) and election variables (year before the election and year of the election). The opportunistic transfers are expected to yield a positive electoral outcome. The vector ECO_{it} consists of Inflation (we use Inf_i for all India Inflation and Inf_s for state level inflation rate) and $Density$, where their corresponding effect on electoral outcome is expected to be negative and dichotomous respectively. Next, the vector POL_{it} consists of voters' turnout in percentage ($Turn$) and the years of experience of the government ($Nypp$) in the office. Historically, a higher turnout has always been a questionable issue in terms of its effect on the electoral outcome. [Hansford and Gomez \(2010\)](#) find that a high turnout produces less predictable electoral outcome whereas, [Grofman, Owen, and Collet \(1999\)](#) find that a higher voter turnout rate could be bad news for the government. Hence, we do not have any prior on this. The probability of winning for the experienced party ($Nypp$) is higher. The vector of dummies are Pol_dum , which consists of political ideology ($Pidum$), state ruling party being the same as that at the center, or an ally of it ($Allied$), coalition government ($Cldum$) at the center for parliamentary election and coalition government at the states for the assembly elections, and if there exist coalition governments at the center, and state ruling party is an ally of it ($Clal_dum$). In all the three cases, we again do not assume any priors. δ_t and θ_i are the time and state level fixed effects. Since, there are presence of the state invariant characteristics for the parliamentary elections such as, year of the election, inflation etc., we use the time trend to capture the time fixed effect whereas, there is usual way to capture the state fixed effects. The time and state fixed effects are captured in a normal way in the case of assembly elections.

The Logit model has been estimated for both parliamentary as well as assembly elections separately. Appendix C from Table C.2 to C.7 report the regression results of Logit model. The columns I, II, III, IV and V report the coefficients and standard errors in the parenthesis in the first sub-column whereas, the second sub-column report the odd-ratios along with the average (semi-) elasticities of $Pr[V = 1|X, u]$, where X is a vector of independent variables.^{12, 13}

5.5.2 Baseline Results

Tables C.2, C.3 and C.4 report the regression results for the parliamentary elections, whereas, the assembly election results have been reported in Tables C.5, C.6 and C.7, in the Appendix C. In each case, the dependent variable is a binary variable V, which takes the value 1 if the government retains power and takes the value 0 otherwise. The remaining variables have been used as independent variables. Both, in parliamentary and assembly elections, the transfers variables used as the independent variables are: *Gfc*, *Lfc* and *Td*.

In case of the parliamentary election, the *Lfc* in levels significantly helps to win. That is, each additional unit of *Lfc* increases the odd of victory by 7% (0.072×1.075) with average (semi-) elasticity of 3.2%, whereas *Gfc* is likely to help to win the election but it is not significant. Also, the interaction of *Gfc* and *Lfc* with the year before the elections and the year of elections dummies do not significantly help to win the election. However, the opportunistic manipulation of *Gfc* in the year before the election is found to be significantly helping in winning the elections with an increase in the odds of the victory by 24% (0.198×1.220), whereas, it is likely to help in winning

¹²The odd-ratio is $\frac{p}{1-p}$ and it measures the probability that $V = 1$ (victory) relative to the probability that $V = 0$. If the odd-ratio is greater than 1 then, it shows more likely to win the election (Williams, 2013).

¹³In Stata programming, *aextlogit* is a wrapper for *xtlogit* which estimates the fixed effects Logit and reports estimates of the average (semi-) elasticities of $Pr(V = 1|X, u)$ with respect to the regressors, and the corresponding standard errors and t-statistics (for further details refer to Kitazawa, 2012; Silva and Kemp, 2016). The average (semi-) elasticity can be defined as, $\eta = \frac{\partial Pr(V=1)}{\partial X} X$, implying that the marginal effect of each X variables on the probability of victory.

but not significant in the case of the year of the election.¹⁴ Similarly, opportunistic manipulations of *Lfc* does not really contribute positively to the possibility of a win. *Td* has a negative sign, and is less likely to help in winning the election, may be because of the independent nature of FC's control over it. Surprisingly, the year before the election manipulation of *Td* significantly helps the incumbent to win the election with the increase in the odds of victory by 28%. However, this is denied by the proponents of the view that *Td* is not subject to political manipulations because this is based on formula based sharing of tax revenue.

Observing the assembly elections, generally *Gfc* does not help in win but *Lfc* helps in winning the elections. Each additional unit of *Lfc* in level increases the odds of victory of assembly elections by 13% (0.118×1.125). Similarly, the year before the elections, year of the election and opportunistic manipulation in the year before the election *Gfc* has a lower likelihood of winning the election. *Lfc* in the year of election and opportunistic manipulation in the year before the election entail a lower likelihood of a win. However, *Lfc* in the year before the election and the opportunistic manipulation of *Gfc* and *Lfc* in the year of election have a positive effect on the winning probability, though not significant. *Td*, in general, as well as in terms of levels, in the year of election and the year before the election, is found to contribute to a win in the assembly elections. This is in stark contrast to the results for the parliamentary election in our analysis.

Evidently, the opportunistic manipulations of *Gfc* in the year before the parliamentary election can help winning the national level election whereas, *Lfc* in levels can help to regain its power in both, the parliamentary and the assembly election (as also confirmed by [Aidt, Veiga, and Veiga, 2011](#); [Drazen and Eslava, 2010](#); [Chortareas, Logothetis, and Papandreou, 2016](#) etc.). Also, it appears that, being an opportunist in terms of transfers is not enough, as it does not significantly help the incumbent to win the election in most of the cases. That is, one cannot deny the role of other

¹⁴This is probably because the component of *Gfc*, which is more open to political manipulations, whereas in the case of *Lfc*, the state has the liability to pay back to the central government and, the central government does not have a big problem in allowing for the loans to be transferred as long as the state is well under the FRBM norms.

uncontrolled variables such as, the role of media, actual implementation of the schemes for which the transfers are intended, characteristics of the party and its members etc. In fact, [Dutta and Gupta \(2014\)](#) and [Gupta and Panagariya \(2014\)](#) show that, the candidates having longer years of education, higher age, wealthier and at least possessing one serious pending criminal case against, can garner higher share of votes.

5.5.3 Economic, Ideological and other Factors Affecting Victory

We now analyze the behavior and impact of the following variables on the probability of winning for the incumbent: *Density*, Inflation (Inf_i/ Inf_s), *Turn*, *Nypp*, *Pidum*, *Allied*, *Cldum* and *Clal_dum*. In general, the results show that each vector of the variables, like ECO_{it} , POL_{it} and Pol_dum_{it} , have a similar impact on the possibility of winning the parliamentary elections and the results are robust across the different models. In fact, the behavior of these variables is not changing very much within and across the models. The vector ECO_{it} consists of Inf_i/ Inf_s and *Density*. In India, a high inflation situation has never been favorable for incumbent's winning possibility. That is, the victory prospects are highly sensitive to Inf_i/ Inf_s for both, the national and the assembly elections. For instance, inflation in the case of basic food items, such as increased onion prices, indeed brought tears in Delhi assembly election for the incumbent BJP in 1998, when they lost the power to the Congress. For the same reason, Congress hardly managed to retain its power in 2010 Delhi assembly election. The reduction in the chances to win parliamentary election is around 12% and that of assembly election is around 2%. Further, a higher population *Density* is less likely to win the election in parliamentary elections but more likely to help winning the assembly elections. The vector POL_{it} consists of *Turn*, *Nypp*. Generally, it is believed that a higher voter turnout works against the incumbent, but in our case it is helping the winning possibility of the incumbent. Similarly, a higher experience of the government (*Nypp*) is more likely to win the election. The last set of variables - *Pidum*, *Allied* and *Clal_dum* - are contained in vector Pol_dum_{it} . In the case of assembly elections, the political ideology (*Pidum*) has been ranked from 1 (right)

to 5 (left). So if, the coefficient of *Pidum* is positive for parliamentary elections and negative (because positive value will show a higher probability of winning for left parties) for assembly elections, the result is coinciding and, correspondingly, it implies that a right-wing government has a higher probability of winning the elections. The results show that the probability of the right-wing incumbent winning the election is higher, and the results are highly significant in the case of assembly elections. If the state and center have the same government, or the state government is an ally (*Allied*), then the prospects of winning the election are less likely in the case of the parliamentary elections, whereas, it helps in winning the election in the case of assembly elections but not significantly. A coalition government *Cldum* is less likely to regain its power in both, the parliamentary and the assembly elections. *Clal.dum* is more likely to win the parliamentary elections but not the assembly elections, though results are not significant.

In most of the cases, the results of parliamentary elections and assembly elections are similar. However, a few results tend to differ, that is, time trend has been used to capture the time fixed effects in parliamentary elections because of the presence of state invariant characteristics of the variables of the date of national elections, all India inflation rate etc. However, the state fixed effects have been captured properly with state index. For assembly election, we use both the time and the state fixed effects, because variables considered are both, state and time variant. The additional dis-similarities are: *Density* is more likely to win the assembly election but not the parliamentary election. Similarly, *Allied* does not help in winning the parliamentary elections though it helps in the case of the assembly elections. Further, if there is a coalition government in the center and the state ruling party is an ally, then the winning probability is higher in the parliamentary election, whereas there is less likelihood of winning the assembly election.

5.6 Conclusion

The governance of sub-national transfers in different forms such as grants from the center, loans from the center and tax devolution involve three important institutions in India, namely these are: Planning Commission (now NITI Aayog), FC and the ministries of the ruling party. Although, the FC is an independent constitutional entity, constituted every five years by the President of India, there is a scope for the central government under Clause 3(c) of Article 280 which reads, “any other matter referred to the commission by the president in the interest of sound finance”, to put certain restrictions on FC.¹⁵ Generally, grants from the center and tax devolution are under the purview of FC. However, the Planning Commission (NITI Aayog) and central government have played a more significant role in determining grants from the center and the loans from the center.

The political transfer cycles in the loans from the center can be traced in the year before the election for the parliamentary elections but these occur in the year of the election for the assembly elections, whereas, grants from the center cycles are found in the year before the assembly elections only. No clear cycles have been traced in the case of tax devolution. These findings are similar to the literature on political budget cycles such as [Aidt, Veiga, and Veiga \(2011\)](#), [Drazen and Eslava \(2010\)](#), [Klomp and De Haan \(2013b\)](#), [Chortareas, Logothetis, and Papandreou \(2016\)](#) etc. A right-wing and coalition incumbent has the tendency to transfer less to the states, however, the former provides more grants to the states in the year of assembly elections. Additionally, if there exists the same party rule at the state level, or if the state is an ally of the center, the allied state receives more rewards from the center in the form of grants from the center and the loans from the center.

Next, we analyze whether such politically motivated transfers actually impact the probability of winning the elections. Using the Logit estimation method, we find that there are not very strong results of politically motivated transfers that affect

¹⁵Finance Commission is an independent constitutional body, constituted every five year by the president under article-280(iii).

the victory of incumbent for both, parliamentary and assembly elections. However, the opportunistic manipulations of the grants from the center in the year before the parliamentary election can help the incumbent to regain its power. Also, the loans from the center in levels generally help winning both, the parliamentary and assembly elections.

The remaining economic, political variables and political dummies are robust in terms of the key results. For instance, inflation is very harmful for the incumbent as it increases the likelihood of losing the election. However, a higher voters' turnout is more likely to help in winning the election for the incumbent, and a more experienced government has a higher probability of winning the election. Similarly, a right-wing government is more likely to win the election, whereas the presence of a coalition government in general reduces the winning possibility in both, the parliamentary and the state elections.

The questions that emerge from this research and can lead to further research are as follows: how do these transfers' cycles behave when the allied parties of the coalition government operate as a special interest group? How will the results be affected if the model is extended to include an industry special interest group, to which the union government provides regulatory benefit and, in return receives bribes to fund the election campaign expenditure (see Chapter 6 for a theoretical analysis of this issue)? The third extension of this chapter could be an analysis of the effect of decentralization on economic growth. All these constitute scope for future work on this subject.

CHAPTER 6

A Dynamic Analysis of Special Interest Politics and Electoral Competition

6.1 Introduction

The relationship between the special interest groups (SIGs) and the political parties/politicians can be traced way back to around 60 BC to 53 BC Roman Empire, when Julius Caesar was aiming for power (consul of the Gaul in Roman Empire) and he took financial help from Marcus Licinius Crassus (the wealthiest man in Roman history) and Gnaeus Pompey Magnus ([Emmert, Alexander and Gardner, Char and Gardner, Robert H \(Producer\[s\]\), Gardner, Robert H \(Director\[s\]\), 2008](#)).¹ Today, SIGs have become an inseparable component of democracies, and in many ways, they are interdependent on each other for quid pro quo. Among many, the influence of an SIG on the election mechanism and citizen's voting behavior is just one. In fact, the presence of an SIG in a democratic sphere has been well documented by many political scientists such as: [Bentley \(1908\)](#), [Schattschneider \(1935\)](#), [Truman \(1951\)](#), and more recently by many economists such as [Olson Jr \(1971\)](#), [Stigler \(1975\)](#), [Austen-Smith \(1987\)](#), [Borooah and Ploeg \(1983\)](#), [Grossman and Helpman \(1994\)](#),

¹The trio - Julius Caesar, Crassus and Pompey – formed a group famously known as ‘the triumvirate’ and they ruled the Roman Empire for many years. Crassus is also considered as one of the wealthiest in the world history in general, and Roman Empire in particular. In return, according to Plutarch, both Crassus and Pompey got tax breaks and land grants. In particular, Crassus accumulated a lot of wealth and power, a vast sum of 7,100 talents, had extensive real estate interests, and owned silver mines. He owned a huge number of slaves and had enormous wealth that he could fund his own army.

1995a, 1995b, 1996, 1999, 2001), Goldberg and Maggi (1999), and Persson (1998). The relationship between politics and interest groups in the democracy can be expressed in the following words of Kuttner:

“The essence of political democracy—the franchise—has eroded, as voting and face-to-face politics give way to campaign-finance plutocracy...[T]here is a direct connection between the domination of politics by special interest money, paid attach ads, strategies driven by polling and focus groups — and the desertion of citizens... People conclude that politics is something that excludes them.”

(Kuttner (1987) quoted in Caplan (2008)).

The last few decades have witnessed the emergence of a large body of literature on the interaction between interest groups and political parties. This relationship has been modeled in many different ways, however, a major thrust has been on how financial contributions (or bribes) offered by interest groups to political parties help them receive regulatory benefit in return. Some of the major contributions are by Grossman and Helpman (1994, 1995a, 1995b, 1996, 1999, 2001) and Goldberg and Maggi (1999), who look at this quid pro quo relationship between the special interest group and political parties/ politicians. In these papers, the basic idea is that the interest groups provide financial contributions (or bribes) to the political parties/ politicians and, in return, they seek changes in economic policies that would be favorably-biased toward them. However, voters might reject this rent-seeking relationship between political parties and interest groups, who nonetheless can be swayed by policies that favor them. Bennedsen and Feldmann (2006) state that the interest groups offer contribution to politicians to get favors in the policy decisions, whereas Magee (2007) finds that the interest group contributes to influence the electoral outcome rather than influencing the political candidate’s policy choices directly. Potters and Van Winden (1992) and Potters, Sloof, and Van Winden (1997) model the financial contributions and lobbying for information in general. However, Potters, Sloof, and Van Winden (1997) extend the campaign contributions model of politicians based on the contributions by the interest groups. They find that interest groups contribute to the

candidates' campaign rather than making direct endorsements. [Denzau and Munger \(1986\)](#), [Mitchell and Munger \(1991\)](#) and [Lohmann \(1995\)](#) find that if the interests of the lobby group are aligned with that of the policymaker's constituency, and voters are neutral over the policies, they have costless access to information and report that truthfully, whereas, if there exist voters preference over policy, then interest group has to pay a higher price to stay relevant in the process of quid pro quo. [Wittman \(2007\)](#) shows that the presence of interest groups is welfare improving if they endorse good quality leaders in the presence of uninformed voters, whereas, [Bonomo and Terra \(2010\)](#) find that the interaction of interest group, voters and government create electoral cycles through economic variables close to the election. The cycles get created when the incumbent signals to distance herself/ himself away from the interest group by bringing biased policy for the majority of the population before the election. They suggest that the cycles can be created through government expenditure composition, aggregate expenditure and appreciation (particularly if the majority is associated with the non-tradable goods) of the real exchange rate. [Lohmann \(1998\)](#) and [Persson \(1998\)](#) find that the political decisions are often biased in favor of special interest group at the cost of mass voters, and these are frequently inefficient. That is, the losses incurred by the majority exceed the gains enjoyed by the minority. Another extreme situation is, if the buying of votes by interest groups is allowed, voters may allow the policy to deviate somewhat from their ideal point to prevent excessive vote buying ([Snyder and Ting, 2008](#)).

Additional literature is based on the competition between political parties or competition between interest groups. [Borooah and Ploeg \(1983\)](#) and [Coughlin, Mueller, and Murrell \(1990b\)](#) are electoral competition models with special interest group, which find that political parties have equilibrium strategies that can be viewed as maximizing a social objective function. The strength of the interest group is seen as the politician's perception of a group's reliability in delivering the votes for its members. [Coate \(2004\)](#) finds that policy-motivated parties compete by selecting candidates and interest groups provide contributions to enhance the electoral prospects of like-minded candidates; contributions are used to finance advertising campaigns that

provide voters with the information on the candidate's ideology. [Prat \(2002\)](#), [Gavious and Mizrahi \(2002\)](#) and [Epstein and O'Halloran \(1995\)](#) state that, prior to the election, the politicians in office invest a constant level of resources on interest groups, while in a period close to the election, politician increases or decreases investment, depending on the electoral significance of that interest group.

There exists empirical evidence as well to support the presence of an SIG in democracies and election processes. [Bouton, Conconi, Pino, and Zanardi \(2013\)](#) use the concept of the 'paradox of gun' to find that even if 90% of the citizens support the regulation on the open purchase of guns in the United States (US), these fail in the senate. In fact, close to the election, senators are more likely to vote for a pro-gun policy, and this would be both in the presence and absence of financial contribution to the senators gun lobbies. Further, [Bouton, Conconi, Pino, and Zanardi \(2014\)](#) find that voters vote on the basis of primary and secondary policy issues, where the former is aimed at attracting the citizen voters through public expenditure, and the latter toward gun control. [Goss \(2010\)](#) explains this as follows: gun lobbies in US are intense, well organized and are willing to vote for and against the candidates purely on the basis of their position on gun control. They are a 'highly motivated', 'intense minority', who prevail over a 'relatively apathetic majority'. In an empirical paper by [Huber and Kirchler \(2013\)](#), the companies who experience abnormal positive post-election returns are those who operated a higher percentage of contributions to the eventual winner in US presidential elections from 1992 to 2004.

In the context of India, [Kapoor and Vaishnav \(2013\)](#) show that, politicians and builders engage in a quid pro quo, whereby the former place their illegal assets with the latter, and the latter rely on the former for a favorable delivery of the wealth during the election. [Sadiraj, Tuinstra, and Van Winden \(2010\)](#) find that the identification of voters with interest groups improves the electoral chances of the challenger whereas, [Fiorino and Ricciuti \(2009\)](#) find that government spending is sensitive to the preferences of heavy industry rather than those of textile and cereal cultivators during 1876 to 1913 Italy. Further, mixed results cannot be denied in some cases. For instance, [Etzioni](#)

(1985) finds interest group to be a threat to the pluralist democracy from a citizens' view point, but the conventional wisdom of political science finds it beneficial. In fact, the elimination of the interest group is not possible and rather competing interest groups tend to counter each other. Lambertini (2001, 2014) model the investment on advertisement and campaigns to the increase vote share and win the election in private and social optimization set up. Gaviious and Mizrahi (2002) model the constant investment by the parties on interest group/ groups and, in return, the latter provide financial contribution and congregate citizen voters for voting support to the former.

This chapter extends the models of Lambertini (2001, 2014) and Gaviious and Mizrahi (2002) in the following ways: (i) spending on election campaign alone is not enough to attract voters; rather it also depends on the offer of expenditure on public good and the structure of tax, which we model explicitly; (ii) Lambertini (2001, 2014) model campaign expenditure, but do not capture the source of it. In fact, often parties spend more than the stipulated amount by the election conducting authorities and, hence, the role of SIG cannot be denied. In our case, we introduce the role of SIG in the objective function separately, where they are not only contribute financially to the parties for campaign advertisements but also have the expectation of receiving regulatory benefit in return. The departure from Gaviious and Mizrahi (2002) is that, apart from the dynamic equation of voting support for political parties/ politicians, our model incorporates the dynamic constraint of financial contribution.

The specific contributions of this research are as follows. The chapter aims to analyze the positive concept of democratic electoral politics where two political parties – non-cooperatively or cooperatively – invest resources in election campaign over a finite horizon to win the consensus of the voters. In an optimal control set up, we analyze whether parties/ politicians overinvest individually than what would be the socially efficient level. For this, we use the framework of Lambertini (2001, 2014), but differ from him as we extend the model to include an SIG in the model that offers financial contributions (or bribes) to both the political parties, in return for an offer of a

policy benefit. The players in our model are: two political parties/ politicians, an SIG and citizen voters. The political parties/ politicians offer to spend on a public good that benefits the citizen voters as well as promise to provide regulatory benefit to SIG. In return, they receive political consensus from the citizen voters and financial contribution from the SIG. The financial contributions could be potentially used for running the election campaign, which would affect the voters' consensus indirectly, which is modeled explicitly by us. We solve for the open-loop and closed-loop non-cooperative Nash equilibria from the perspective of the political parties, and compare these with the outcomes when the political party is a benevolent social planner that maximizes the joint welfare of both the parties. In this respect as well, we go beyond [Lambertini \(2014\)](#) in that we show that the closed-loop solution coincides with the open loop one.

The key results of our analysis are as follows:

- The closed-loop solution collapses to an open-loop one. That is, commitment to its own plan of action by the parties, given the initial state and time, results in the same outcome even if the political parties change their strategy based on the state at every point in time.
- The offer of the expenditure on public good is higher if a unit voting support is higher. The offer of higher expenditure also requires a correspondingly larger lump-sum tax and higher withdrawal of voters relative to the discount factor (at which the accumulation of net voting support and financial contribution received build up).
- If the unit voting support and financial contribution to one party is higher than to the other, and the voting support and financial contribution withdrawal is higher than the discount factor at which the accumulation of the net benefit of voting support and net financial contribution build up, political parties will offer a positive and higher expenditure on public good and render a positive regulatory benefit in order to seek a larger share of voting support and financial contribution.

- A lower unit cost of offer of expenditure on the public good and regulatory benefit enhances the offer of expenditure and regulatory benefit resulting in larger voting share and financial contribution. A higher financial contribution or bribe also provides a higher regulatory benefit to the SIG and a larger voting share to the political party.
- The voting support and financial contribution received by one party will always be higher than the other party's if the unit voting support and unit financial contribution of bribe is higher for it than for the other party.
- The outcomes at the private optimum are always higher than those at the social optimum in terms of the offer of expenditure on public goods and regulatory benefit by the political parties, voting support by citizen voters and financial contributions by the SIG.
- At the private optimum, the offer of expenditure on the public good tends toward overspending by the political party in response to the voting support that it receives from the voters. A corollary to this result is that, higher the voting support, higher is the offer of expenditure on public good by any political party.
- In comparison, again at the private optimum, the promise of regulatory benefit is more favorable, higher are the voting support from citizen voters and financial contributions from the SIG.
- The optimal solutions at the private and social optimum constitute a steady state saddle point equilibria.

The structure of the paper is as follows. Section 6.2 lays out the framework of the model and the important definitions. Section 6.3 analyzes the objective function of the players. Section 6.4 presents the definitions and structure of the open-loop and closed-loop strategies. Section 6.5 derives and analyzes the private optimum solutions under open-loop and closed-loop framework. Section 6.6 characterizes the solutions for the co-operative/ social optimum equilibrium. Section 6.7 compares the private

and social optima and, Section 6.8 concludes.

6.2 Model Framework

This chapter aims to analyze the electoral competition between two political parties/politicians in the presence of voters and an SIG (industrial interest/ lobby group). A priori, the political parties offer plans to increase expenditure on a public good, voters observe the offer and vote reciprocally. In addition, political parties also offer regulatory benefit (or a policy favor) to the SIG, in exchange for financial contributions to meet the (large) expenses of election campaign and advertisements.

6.2.1 Cost Functions

In this two-player game, we assume a quadratic cost structure of provisioning the public good as well as the regulatory benefit offered to the SIG. Each of the two political parties/politicians announce an offer of expenditure on the public good. We postulate that this expenditure is incurred in relation to the tax revenue, τ , generated in the economy, which is assumed to be given exogenously. Thus, the cost function is depicted as follows:

$$C_1(t) = \frac{\phi_1 g_i(t)^2}{2 \tau}, \quad (6.1)$$

where $g_i(t)$ ($i = 1, 2$) is the offer of expenditure on the public good by the political party/politician i , which they do not renege on if they are voted to power. The voters provide voting support retrospectively, based on the promise of delivery of the public good. The voting support by the citizen voters is denoted by $m_i(t)$. The counterpart of party i is denoted as party/politician j in a similar manner. The voters not only care for the offer of expenditure on the public good g , but the expenditure relative to the offer of lump-sum tax τ charged from them. Also, ϕ_1 captures the cost per unit government expenditure relative to the lump-sum tax.

There exists an industrial lobby or SIG, which is powerful enough to influence the economic policy positions of the political parties. The political parties/ politicians offer regulatory benefit to SIG and, in return, receive financial contribution for running the election campaign, with election slated to take place at the end of the period T . The associated cost of regulatory benefit to the SIG is depicted as:

$$C_2(t) = \frac{\phi_2}{2} r_i(t)^2, \quad (6.2)$$

where $r_i(t)$ ($i = 1, 2$) is the regulatory benefit promised to the SIG by the political party/ politician i . Again, it is assumed that the political contestants adhere to their promise to implement the favorable regulatory benefit to the SIG after coming to power. In return, political party i can receive the financial contribution, $b_i(t)$, from this SIG. A similar structure applies for the political party j as well. So, apart from financial contribution, SIG votes in favor of the preferred political party. Here, ϕ_2 captures the cost per unit of the regulatory benefit given to the SIG.

The aggregate cost to the economy at time t is the sum of the costs due to expenditure on public good (relative to the lump-sum tax) and the revenue lost due to the regulatory benefit to the SIG. That is:

$$D(t) = C_1(t) + C_2(t). \quad (6.3)$$

The election, which is not modeled explicitly here, is assumed to take place with certainty at date T . The time component $t \in [0, T]$, where ‘ t ’ refers to any date during the election cycle. At the terminal date, T , voters vote for the party/ politician they prefer.

6.2.2 Dynamic Evolution of Voting Support and Financial Contribution

In our analytical model, two political parties/ politicians compete with each other for voting support and financial contributions. That is, in the two player game, there

are two types of interactions between the political parties. First, they compete for voting support by making an offer of expenditure on public good to the voters. The dynamic consensus of the voters evolves for party i as follows:

$$\dot{m}_i(t) = g_i(t) - \alpha_1 g_j(t) - \alpha_2 m_i(t) + \alpha_3 b_i(t), \quad (6.4)$$

where, $\dot{m}_i(t)$ is the change in voting consensus/ support over time, which is positively related to its own offer of expenditure, $g_i(t)$, on public good. Further, the rival party's offer of the expenditure is assumed to have a negative spill over effect on party i 's consensus, through $\alpha_1 g_j(t)$. Overtime, there is also a friction of voters depicted as $\alpha_2 m_i(t)$. Finally, the equation of motion of voting support is positively related to the financial contribution. That is, there is a positive spill over effect of financial contribution received by party i , captured as $\alpha_3 b_i(t)$. We assume that $\alpha_1, \alpha_2 \in [0, 1]$, and there is no restrictions on α_3 .

Second, given that there exists competition between political parties for seeking financial contributions from the SIG, in return for regulatory benefit, the dynamic equation of financial contribution received by political party i from SIG will be,

$$\dot{b}_i(t) = r_i(t) - \beta_1 r_j(t) - \beta_2 b_i(t), \quad (6.5)$$

where, $\dot{b}_i(t)$ is the change in financial contribution over time, which is positively related to the regulatory benefit offered to the SIG, $r_i(t)$. Further, through $\beta_1 r_j(t)$, the regulatory benefit offered by the rival is assumed to have a negative effect on party i 's financial receipt. Overtime, there is some financial withdrawal (friction) captured by $\beta_2 b_i(t)$ by SIG as well. Again, the parameters $\beta_1, \beta_2 \in [0, 1]$.

6.3 Politician's Objective Function

We consider two political parties that are contesting the election at date T . Accordingly, the objective function of player i can be written as:

$$\begin{aligned} \underset{\{g_i, r_i\}}{\text{Max}} \int_0^T \left[\theta \left[\delta_i m_i(t) - \frac{\phi_1}{2} \frac{g_i(t)^2}{\tau} \right] + (1 - \theta) \left[\gamma_i b_i(t) - \frac{\phi_2}{2} r_i(t)^2 \right] \right] e^{\rho t} dt \\ + e^{\rho T} Z_1[m_i(T)] + e^{\rho T} Z_2[b_i(T)], \end{aligned} \quad (6.6)$$

where $e^{\rho t}$ is the factor at which net voting support and financial contribution build up. The instantaneous discount rate ρ is constant and positive. That is, the events close to the election, which are going to take place at the future date, are more important than today for political parties/ politicians to win the election because of the voters decaying memory in the electoral term. This assumption is similar to [Nordhaus \(1975\)](#) and [Lambertini \(2014\)](#).² The relative preference parameter (or the weight) that the political contestants place on net voting support versus financial contribution is $\theta \in [0, 1]$. Thus, it is assumed that if $\theta > 1/2$, political parties care relatively more about net voting support and less for the net gain from the SIG's financial contribution; the opposite holds when $\theta < 1/2$. If $\theta = 1$, the model collapses to the framework of [Lambertini \(2001, 2014\)](#) and the role of SIG disappears. The parameter ϕ_1 is the unit cost attached to the offer of expenditure on public good, $g_i(t)$, relative to lump-sum tax τ . The parameter ϕ_2 is the unit cost associated with regulatory benefit, $r_i(t)$, rendered to the SIG. For instance, if the SIG (such as a corporate lobby) gets a relaxation in pollution tax, citizen voters suffer an externality from excessively polluted air. The term $\delta_i m_i(t)$ denotes the gross benefit accruing to political party i from voting support, and $\gamma_i b_i(t)$ refers to the gross benefit reaped from financial contributions received from the SIG. Also, the model assumes full information, where

²When the length of the electoral term is given (that is, the date of election is known), [Nordhaus \(1975\)](#) relies on a discount factor, μ , which is positive, and calls it a decaying memory where the recent pains are more painful than the past. [Lambertini \(2014\)](#) also uses the discount factor ρ in the value function as negative, and refers to the future date as more relevant than today whereas, for a given electoral term, [Gavious and Mizrahi \(2002\)](#) work without any discount factor and state that, if the date of election is sufficiently away, the party in power should invest the resources constantly.

voters know everything about the relationship between the political parties and the SIG. That is, the interaction between the political contestants and the SIG is common knowledge. The two control variables in our analysis are the offer of expenditure on public good, $g_i(t)$, and regulatory benefit $r_i(t)$ by party i , and the respective state variables are $m_i(t)$ and $b_i(t)$. The discounted scrap value functions (SVF) of the state variables are: $e^{\rho T} Z_1[m_i(T)]$ and $e^{\rho T} Z_2[b_i(T)]$.

6.4 Solution Concept: Open-loop and Closed-loop Strategies

In our model, there exists strategic interaction between the two political parties/politicians in the presence of voters and SIG. This could take the form of an open-loop strategy, where the player is committed to his/her plan of action chosen at $t = 0$, or, a closed-loop strategy, where the plan of action of the player is contingent on the state and time, such that it evolves in terms of the impact of change in the state on the control variable (see also [Basar and Olsder, 1995](#), pp. 225-226; [Hämäläinen and Ehtamo, 1991](#), pp. 122-132; [Fershtman and Kamien, 1990](#)). More formally, we define the open- and closed-loop strategies as follows:

6.4.1 Open-loop Strategy

Suppose the information set of the player i is, $\kappa_i(t)$: the information available to player i at time t . The open-loop information trajectory is:

$$\kappa_i^{OL}(t) = \{m_0, b_0, t\}, \forall t \in [0, T], \quad (6.7)$$

where, each player observes the initial conditions of the other player and chooses the open-loop controls as:

$$g_i(t) : [0, \bar{g}_i] \rightarrow G_i; \quad (6.8)$$

$$r_i(t) : [0, \bar{r}_i] \rightarrow R_i. \quad (6.9)$$

In this plan of action of the game, players cannot change the path of the controls decided initially or they are committed to. Accordingly, the open-loop strategy space for player i is,

$$s_i^{OL} = \{g_i(t)/g_i(t) \text{ is continuous and } s_i \in [0, \bar{g}_i] \quad \forall t\}; \quad (6.10)$$

$$\text{and } s_i^{OL} = \{r_i(t)/r_i(t) \text{ is continuous and } s_i \in [0, \bar{r}_i] \quad \forall t\}. \quad (6.11)$$

The player's actions, in this case, depends only on the time and initial conditions and not on the state variables, $m(t)$ and $b(t)$. Thus, an open-loop Nash equilibrium for the game described by the two dynamic constraints in eq. (6.4) and (6.5) is a pair of open-loop strategies $(g_i^*, g_j^*, r_i^*, r_j^*) \in s_i \times s_j$ such that,

$$\Pi_i(g_i^*, g_j^*, r_i^*, r_j^*) \geq \Pi_i(g_i, g_j^*, r_i, r_j^*), \quad \forall g_i, r_i \in s_i^{OL}. \quad (6.12)$$

6.4.2 Closed-loop Strategy

A closed-loop information trajectory, $\kappa_i^{CL}(t)$ is defined as:

$$\kappa_i^{CL}(t) = \begin{cases} m(t'), & 0 \leq t' \leq t \\ b(t'), & 0 \leq t' \leq t \end{cases}, \quad \text{where, } t \in [0, T]. \quad (6.13)$$

In this case, the path chosen by the player is a closed-loop control, which depends on the trajectory of the evolution of the game. That is, the player controls the strategy at every point of time. In our case, the closed-loop controls are:

$$\Phi_i(t, m, b) : [0, \bar{g}_i] \times M \rightarrow G_i; \quad (6.14)$$

$$\Phi_i(t, m, b) : [0, \bar{r}_i] \times B \rightarrow R_i. \quad (6.15)$$

In a closed-loop system, players can perturb their controls depending on the state of the system. That is, players' plan of action depends on the state and the time.

Accordingly, the closed-loop strategy space for player i will be,

$$s_i^{CL} = \{g_i(t, m, b)/g_i(t, m, b) \in [0, \bar{g}_i], \\ g_i(t, m, b) \text{ is continuous in } (t, m, b), \forall t\}; \quad (6.16)$$

$$\text{and } s_i^{CL} = \{r_i(t, m, b)/r_i(t, m, b) \in [0, \bar{r}_i], \\ r_i(t, m, b) \text{ is continuous in } (t, m, b), \forall t\}. \quad (6.17)$$

Thus, a closed-loop Nash equilibrium is a pair of feedback strategies $(g_i^*, g_j^*, r_i^*, r_j^*) \in s_i \times s_j$ such that,

$$\Pi_i(g_i^*, g_j^*, r_i^*, r_j^*) \geq \Pi_i(g_i, g_j^*, r_i, r_j^*), \quad \forall g_i, r_i \in s_i^{CL}, \quad \text{where } i \neq j. \quad (6.18)$$

To derive the optimal solutions for the open-loop and closed-loop settings, we use the method of optimal control ([Nordhaus, 1975](#); [Chiang, 1992](#), pp. 193-199; [Lambertini, 2001, 2014](#) and [Cellini and Lambertini, 2007](#)).

The paper now proceeds to characterize the open-loop and closed-loop solutions under the private and social optima.

6.5 The Private Optimum

We first investigate the outcome of a non-cooperative game where each political party maximizes its own discounted (constrained) utility. In the open-loop equilibrium, a player is committed to its own plan of action, which just depends on the initial conditions and time. This is analyzed as follows.

6.5.1 Open-loop Solution

As the dynamics of voting and financial contribution move according to eqs. [\(6.4\)](#) and [\(6.5\)](#), the corresponding open-loop Current Value Hamiltonian (CVH) for party/

politician i can be expressed as:

$$\begin{aligned}
\mathcal{H}_i(t) = & \left[\theta \left[\delta_i m_i(t) - \frac{\phi_1}{2} \frac{g_i(t)^2}{\tau} \right] + (1 - \theta) \left[\gamma_i b_i(t) - \frac{\phi_2}{2} r_i(t)^2 \right] \right] \\
& + \lambda_{ii}(t) [g_i(t) - \alpha_1 g_j(t) - \alpha_2 m_i(t) + \alpha_3 b_i(t)] \\
& + \lambda_{ij}(t) [g_j(t) - \alpha_1 g_i(t) - \alpha_2 m_j(t) + \alpha_3 b_j(t)] \\
& + \psi_{ii}(t) [r_i(t) - \beta_1 r_j(t) - \beta_2 b_i(t)] \\
& + \psi_{ij}(t) [r_j(t) - \beta_1 r_i(t) - \beta_2 b_j(t)], \tag{6.19}
\end{aligned}$$

where, $\lambda_{ii}(t)$ is the current value adjoint variable of player i with respect to itself and $\lambda_{ij}(t)$ is the current value adjoint variable of player i with respect to player j . Both of these multipliers, respectively, measure the current value shadow prices of an additional marginal unit of voting support levels, m_i and m_j , evaluated by player i . Similarly, $\psi_{ii}(t)$ and ψ_{ij} , respectively, measure the current value shadow prices of the additional marginal unit of the financial contributions received, b_i and b_j , evaluated by player i . Equivalently, $\lambda_{ii}(t) = \mu_{ii}(t)e^{-\rho(t)}$ and $\lambda_{ij}(t) = \mu_{ij}(t)e^{-\rho(t)}$, such that $\mu_{ii}(t)$ and $\mu_{ij}(t)$ are the co-state variables associated with states $m_i(t)$ and $m_j(t)$. Further, $\psi_{ii}(t) = \eta_{ii}(t)e^{-\rho(t)}$ and $\psi_{ij}(t) = \eta_{ij}(t)e^{-\rho(t)}$, where $\eta_{ii}(t)$ and $\eta_{ij}(t)$ are the co-state variables associated to states b_i and b_j .

We first solve for the non-cooperative open-loop Nash outcome, where each party maximizes its own discounted (constrained) utility. The open-loop solution leads to the following results.

Proposition 1: *At the open-loop stable equilibrium, party i 's offer of expenditure on public good is $g_i^* = \Omega_1 \delta_i$ and the regulatory benefit is $r_i^* = [\Omega_2 \gamma_i + \Omega_2 \Omega_3 \delta_i]$. The corresponding stable equilibrium voting support level is solved to be $m_i^* = \frac{1}{\alpha_2} [\Omega_2 \frac{\alpha_3}{\beta_2} (\gamma_i - \beta_1 \gamma_j) + (\Omega_1 + \Omega_2 \Omega_3 \frac{\alpha_3}{\beta_2}) \delta_i - (\Omega_1 \alpha_1 + \Omega_2 \Omega_3 \frac{\alpha_3}{\beta_2} \beta_1) \delta_j]$ and the financial contribution is $b_i^* = \frac{1}{\beta_2} [\Omega_2 (\gamma_i - \beta_1 \gamma_j) + \Omega_2 \Omega_3 (\delta_i - \beta_1 \delta_j)]$, where, $\Omega_1 = \frac{\tau}{\phi_1 (\alpha_2 - \rho)}$, $\Omega_2 = \frac{1}{\phi_2 (\beta_2 - \rho)}$, $\Omega_3 = \frac{\theta \alpha_3}{[(1 - \theta) (\alpha_2 - \rho)]}$.*

Proof: The open-loop Nash equilibrium can be solved from the following first-order conditions:

$$\frac{\partial \mathcal{H}_i(t)}{\partial g_i(t)} = 0 \Rightarrow \frac{\theta \phi_1}{\tau} g_i(t) = \lambda_{ii}(t) - \alpha_1 \lambda_{ij}(t); \quad (6.20)$$

$$\dot{\lambda}_{ii}(t) + \rho \lambda_{ii}(t) = -\frac{\partial \mathcal{H}_i(t)}{\partial m_i(t)} \Rightarrow \dot{\lambda}_{ii}(t) = (\alpha_2 - \rho) \lambda_{ii}(t) - \theta \delta_i; \quad (6.21)$$

$$\dot{\lambda}_{ij}(t) + \rho \lambda_{ij}(t) = -\frac{\partial \mathcal{H}_i(t)}{\partial m_j(t)} \Rightarrow \dot{\lambda}_{ij}(t) = (\alpha_2 - \rho) \lambda_{ij}(t); \quad (6.22)$$

$$\text{and, } \frac{\partial \mathcal{H}_i(t)}{\partial r_i(t)} = 0 \Rightarrow (1 - \theta) \phi_2 r_i(t) = \psi_{ii}(t) - \beta_1 \psi_{ij}(t); \quad (6.23)$$

$$\begin{aligned} \dot{\psi}_{ii}(t) + \rho \psi_{ii}(t) = -\frac{\partial \mathcal{H}_i(t)}{\partial b_i(t)} \Rightarrow \dot{\psi}_{ii}(t) &= (\beta_2 - \rho) \psi_{ii}(t) \\ &\quad - \alpha_3 \lambda_{ii}(t) - (1 - \theta) \gamma_i; \end{aligned} \quad (6.24)$$

$$\dot{\psi}_{ij}(t) + \rho \psi_{ij}(t) = -\frac{\partial \mathcal{H}_i(t)}{\partial b_j(t)} \Rightarrow \dot{\psi}_{ij}(t) = (\beta_2 - \rho) \psi_{ij}(t) - \alpha_3 \lambda_{ij}(t). \quad (6.25)$$

Here, the initial conditions are assumed to be: $m_i(0) = m_{i0}$ and $r_i(0) = r_{i0}$. This is the case of a truncated vertical terminal line, and, hence, T is fixed but the terminal state is free, subject to $Z_1[m_i(T)] = m_i(T) - m_{min} \geq 0$ and $Z_2[b_i(T)] = b_i(T) - b_{min} \geq 0$, where, m_{min} and b_{min} are the minimum stocks of voting support and financial contribution respectively. Accordingly, the associated SVFs can be written as (see also [Chiang, 1992](#), pp. 181-183, 209):

$$\lambda_{ii}(T) \geq 0, \quad Z_1[m_i(T)] \geq 0, \quad \text{and} \quad [m_i(T) - m_{min}] \lambda_{ii}(T) = 0; \quad (6.26)$$

$$\psi_{ii}(T) \geq 0, \quad Z_2[b_i(T)] \geq 0, \quad \text{and} \quad [b_i(T) - b_{min}] \psi_{ii}(T) = 0. \quad (6.27)$$

Similar adjoint SVFs will hold for $\lambda_{ij}(T)$ and $\psi_{ij}(T)$ as well. From the respective shadow values associated with the dynamic equations of voting support and financial contributions on the day of election, that is, T , eqs. (6.26) and (6.27) can be written as;

$$e^{-\rho T} \mu_{ii}(T) = 0 \Rightarrow \lambda_{ii}(T) = 0 \Rightarrow m_i(T) > m_{min}; \quad (6.28)$$

$$e^{-\rho T} \eta_{ii}(T) = 0 \Rightarrow \psi_{ii}(T) = 0 \Rightarrow b_i(T) > b_{min}. \quad (6.29)$$

These follow from $m_i(T)$ and $b_i(T)$ being free. Analogously, similar SVFs will hold for $\lambda_{ij}(T)$ and $\psi_{ij}(T)$. Further, it is easy to show that $\lambda_{ij}(t) = 0 \quad \forall t \in [0, T]$, which would reduce eq. (6.20) to

$$\frac{\theta\phi_1}{\tau}g_i(t) = \lambda_{ii}(t). \quad (6.30)$$

This can be substituted into eq. (6.21) to yield,

$$\dot{\lambda}_{ii}(t) = (\alpha_2 - \rho)\frac{\theta\phi_1}{\tau}g_i(t) - \theta\delta_i. \quad (6.31)$$

From, eqs. (6.30) and (6.31) it can be inferred that:

$$\frac{\partial g_i(t)}{\partial t} \propto \frac{\partial \lambda_{ii}(t)}{\partial t} = (\alpha_2 - \rho)\frac{\theta\phi_1}{\tau}g_i(t) - \theta\delta_i. \quad (6.32)$$

Along the steady state, as $\dot{\lambda}_{ii}(t) = 0$, the solution for g_i will be:

$$g_i^* = \frac{\tau}{[\phi_1(\alpha_2 - \rho)]}\delta_i \quad (6.33)$$

$$\Leftrightarrow g_i^* = \Omega_1\delta_i, \quad \text{where,} \quad \Omega_1 = \frac{\tau}{\phi_1(\alpha_2 - \rho)}. \quad (6.34)$$

From eq. (6.4) we find the solution for $m_i(t)$ at $\dot{m}_i(t) = 0$. Substituting eq. (6.33) for $g_i(t)$ and its symmetric solution for $g_j(t)$ yields:

$$m_i(t) = \frac{\tau}{[\alpha_2(\alpha_2 - \rho)]}(\delta_i - \alpha_1\delta_j) + \frac{\alpha_3}{\alpha_2}b_i(t). \quad (6.35)$$

As stated earlier, from $\lambda_{ij} = 0$ it follows that $\psi_{ij}(t) = 0 \quad \forall t \in [0, T]$, which reduces eq. (6.23) to

$$(1 - \theta)\phi_2r_i(t) = \psi_{ii}(t). \quad (6.36)$$

Substituting eqs. (6.30) and (6.36) into (6.24) gives:

$$\dot{\psi}_{ii}(t) = (\beta_2 - \rho)(1 - \theta)\phi_2 r_i(t) - \alpha_3 \frac{\theta\phi_1}{\tau} g_i(t) - (1 - \theta)\gamma_i. \quad (6.37)$$

From eqs. (6.36) and (6.37), the differential equation can be written as:

$$\frac{\partial r_i(t)}{\partial t} \propto \frac{\partial \psi_{ii}(t)}{\partial t} = (\beta_2 - \rho)(1 - \theta)\phi_2 r_i(t) - \alpha_3 \frac{\theta\phi_1}{\tau} g_i(t) - (1 - \theta)\gamma_i. \quad (6.38)$$

Along the steady state, with $\dot{\psi}_{ii}(t) = 0$ and substituting for g_i^* of eq. (6.33) in eq. (6.38), the solution for $r_i(t)$ will be,

$$r_i^*(t) = \frac{1}{[\phi_2(\beta_2 - \rho)]} \left[\gamma_i + \frac{\theta}{1 - \theta} \frac{\alpha_3}{(\alpha_2 - \rho)} \delta_i \right] \quad (6.39)$$

$$\Leftrightarrow r_i^* = [\Omega_2 \gamma_i + \Omega_2 \Omega_3 \delta_i], \quad (6.40)$$

where, $\Omega_2 = \frac{1}{\phi_2(\beta_2 - \rho)}$ and $\Omega_3 = \frac{\theta\alpha_3}{[(1 - \theta)(\alpha_2 - \rho)]}$.

From eq. (6.5) at $\dot{b}_i(t) = 0$, the equilibrium solution will be:

$$b_i^*(t) = \frac{1}{[\beta_2\phi_2(\beta_2 - \rho)]} \left[(\gamma_i - \beta_1\gamma_j) + \frac{\theta}{1 - \theta} \frac{\alpha_3}{(\alpha_2 - \rho)} (\delta_i - \beta_1\delta_j) \right]; \quad (6.41)$$

$$\Leftrightarrow b_i^* = \frac{1}{\beta_2} [\Omega_2(\gamma_i - \beta_1\gamma_j) + \Omega_2\Omega_3(\delta_i - \beta_1\delta_j)]. \quad (6.42)$$

Substituting eq. (6.41) into (6.35) yields:

$$m_i^*(t) = \left[\frac{\tau}{[\alpha_2\phi_1(\beta_2 - \rho)]} \right] (\delta_i - \alpha_1\delta_j) + \left[\frac{\alpha_3}{[\alpha_2\beta_2\phi_2(\beta_2 - \rho)]} \right] (\gamma_i - \beta_1\gamma_j) \\ + \frac{\theta}{1 - \theta} \left[\frac{\alpha_3}{[\alpha_2\beta_2\phi_2(\beta_2 - \rho)(\alpha_2 - \rho)]} \right] (\delta_i - \beta_1\delta_j); \quad (6.43)$$

$$\Rightarrow m_i^*(t) = \frac{1}{\alpha_2} \left[\frac{1}{\phi_2(\beta_2 - \rho)} \frac{\alpha_3}{\beta_2} (\gamma_i - \beta_1\gamma_j) \right] \\ + \frac{1}{\alpha_2} \left[\frac{\tau}{\phi_1(\alpha_2 - \rho)} + \frac{1}{\phi_2(\beta_2 - \rho)} \frac{\theta\alpha_3}{[(1 - \theta)(\alpha_2 - \rho)]} \frac{\alpha_3}{\beta_2} \right] \delta_i \\ - \frac{1}{\alpha_2} \left[\frac{\tau}{\phi_1(\alpha_2 - \rho)} \alpha_1 + \frac{1}{\phi_2(\beta_2 - \rho)} \frac{\theta\alpha_3}{[(1 - \theta)(\alpha_2 - \rho)]} \frac{\alpha_3}{\beta_2} \beta_1 \right] \delta_j; \quad (6.44)$$

$$m_i^* = \frac{1}{\alpha_2} \left[\Omega_2 \frac{\alpha_3}{\beta_2} (\gamma_i - \beta_1\gamma_j) + (\Omega_1 + \Omega_2\Omega_3 \frac{\alpha_3}{\beta_2}) \delta_i - (\Omega_1\alpha_1 + \Omega_2\Omega_3 \frac{\alpha_3}{\beta_2} \beta_1) \delta_j \right]. \quad (6.45)$$

Thus, the equilibrium solutions for the control and state variables at the private

optimum will be:

$$g_i^* = \Omega_1 \delta_i; \quad (6.46)$$

$$r_i^* = [\Omega_2 \gamma_i + \Omega_2 \Omega_3 \delta_i]; \quad (6.47)$$

$$b_i^* = \frac{1}{\beta_2} [\Omega_2 (\gamma_i - \beta_1 \gamma_j) + \Omega_2 \Omega_3 (\delta_i - \beta_1 \delta_j)]; \quad (6.48)$$

$$m_i^* = \frac{1}{\alpha_2} \left[\Omega_2 \frac{\alpha_3}{\beta_2} (\gamma_i - \beta_1 \gamma_j) + (\Omega_1 + \Omega_2 \Omega_3 \frac{\alpha_3}{\beta_2}) \delta_i - (\Omega_1 \alpha_1 + \Omega_2 \Omega_3 \frac{\alpha_3}{\beta_2} \beta_1) \delta_j \right]. \quad (6.49)$$

where, Ω_1 , Ω_2 and Ω_3 are as defined above.

Proposition 2: *The offer of expenditure on public good is higher if the unit voting support (δ) is higher. The offer of higher expenditure also requires, correspondingly, a larger lump-sum tax (τ), and higher withdrawal of voters (α_2) relative to the discount factor at which net voting support and financial contribution received get accumulated (ρ).*

Notably, Ω_1 consists of the tax parameter, τ , as well as constants ϕ_1 , α_2 and ρ . Thus, there exists a one-to-one correspondence between $g(t)$ and τ . Intuitively, a higher exogenous level of τ will entail a higher expenditure on the public good and, thus translate into the possibility of a larger vote share for party i . The parameter ϕ_1 is per unit cost incurred due to expenditure on public good relative to lump-sum tax imposed. A lower cost per unit of expenditure will also imply a higher expenditure on public good. The parameter α_2 captures the friction associated with voting support, which is reciprocally associated with the expenditure on public good. As long as $\alpha_2 > \rho$, that is, withdrawal of the voters exceeds the value at which net voting support and net financial contribution received build up, the offer of the expenditure on public good goes up.

Proposition 3: *If $\delta_i > \delta_j$, $\gamma_i > \gamma_j$ and $\alpha_2, \beta_2 > \rho$, political parties will offer a positive and higher expenditure on public good and render a positive regulatory benefit*

in order to seek a larger share of voting support and financial contribution. The lower per unit cost of offer of expenditure on public good and regulatory benefit enhance the offer of expenditure and regulatory benefit to receive a larger voting share and financial contribution. A higher financial contribution of bribe also provides a higher regulatory benefit to the SIG and a larger voting share to the political party.

The notation Ω_2 contains parameters ϕ_2, β_2 and ρ , and Ω_3 contain parameters $\theta, \alpha_3, \alpha_2$ and ρ . Clearly, as long as $\alpha_2, \beta_2 > \rho$, political parties will offer a positive expenditure on public good and render a positive regulatory benefit in order to seek a larger share of voting support and financial contribution. That, is as long as the effectiveness of the frictions (withdrawal) of the voters, that is, α_2 and effectiveness of withdrawal of the financial contributors, β_2 , exceeds the discount factor ρ (at which the respective accumulation of net benefit of voting support and net benefit of financial contribution build up) political party i offers to spend a larger amount on public good and provide higher regulatory benefit. Further, a lower per unit cost of regulatory benefit will encourage party i to provide a higher regulatory benefit to the SIG. Consequently, a higher regulatory benefit given to the SIG is associated with higher financial contribution received per unit, and i will also give larger relative weight on net voting support.

Proposition 4: *The voting support (m) and financial contribution (b) received by party i will always be higher than party j 's if $\delta_i > \delta_j$ and $\gamma_i > \gamma_j$.*

It is also easy to see that, in equilibrium, (i) the offer of the expenditure on public good by party i will always be higher than j 's if the associated respective per unit consensus received, $\delta_i > \delta_j$; (ii) the party/ politician i 's stable equilibrium offers of regulatory benefit to the SIG will be higher than j 's if the respective per unit consensus received $\delta_i > \delta_j$, and the financial contribution incurred is such that $\gamma_i > \gamma_j$. Conditions (i) and (ii) also ensure that voting support and financial contribution received by party i will always be higher than party j 's if $\delta_i > \delta_j$ and $\gamma_i > \gamma_j$.

To analyze the dynamic stability of the states and controls, we get the 4×4 matrix of the Jacobian. The stability analysis of the dynamic equations leads to the following proposition.

Proposition 5: *The open-loop equilibrium $(m_i^*, b_i^*, g_i^*, r_i^*)$ is a saddle point equilibrium.*

Proof: The required equation of motions are:

$$\dot{m}_i(t) = g_i(t) - \alpha_1 g_j(t) - \alpha_2 m_i(t) + \alpha_3 b_i(t); \quad (6.50)$$

$$\dot{b}_i(t) = r_i(t) - \beta_1 r_j(t) - \beta_2 b_i(t); \quad (6.51)$$

$$\dot{g}_i(t) = (\alpha_2 - \rho)g_i(t) - \frac{\tau}{\phi_1}\delta_i; \quad (6.52)$$

$$\dot{r}_i(t) = (\beta_2 - \rho)r_i(t) - \alpha_3 \frac{\theta}{1-\theta} \frac{\phi_1}{\phi_2} g_i(t) - \frac{1}{\phi_2} \gamma_i. \quad (6.53)$$

The stability analysis of the equation system from eqs. (6.50) - (6.53) depends on the signs of the trace and determinant of the Jacobian matrix. We have,

$$J = \begin{bmatrix} -\alpha_2 & \alpha_3 & 1 & 0 \\ 0 & -\beta_2 & 0 & 1 \\ 0 & 0 & \alpha_2 - \rho & 0 \\ 0 & 0 & -\alpha_3 \frac{\theta}{1-\theta} \frac{\phi_1}{\phi_2} & \beta_2 - \rho \end{bmatrix} \bigg|_{(m_i^*, b_i^*, g_i^*, r_i^*)}. \quad (6.54)$$

We find that the trace, $Tr(J) = -2\rho < 0$ and the determinant $\Delta(J) = \alpha_2 \beta_2 [(\alpha_2 - \rho)(\beta_2 - \rho)] > 0$ ³. To find out the characteristic roots of the Jacobian we write the matrix as follows:

$$(J - \omega I) = \begin{bmatrix} -\alpha_2 - \omega & \alpha_3 & 1 & 0 \\ 0 & -\beta_2 - \omega & 0 & 1 \\ 0 & 0 & (\alpha_2 - \rho) - \omega & 0 \\ 0 & 0 & -\alpha_3 \frac{\theta}{1-\theta} \frac{\phi_1}{\phi_2} & (\beta_2 - \rho) - \omega \end{bmatrix} \bigg|_{(m_i^*, b_i^*, g_i^*, r_i^*)} = 0. \quad (6.55)$$

³Even if ρ exceeds α_2 and β_2 , $\Delta(J) > 0$

The determinant of eq. (6.55) can be calculated as, $(-\alpha_2 - \omega)(-\beta_2 - \omega)(\rho + \alpha_2 - \omega)(\rho + \beta_2 - \omega) = 0$, which implies the solution to be: $\omega_1 = -\alpha_2$, $\omega_2 = -\beta_2$, $\omega_3 = \alpha_2 - \rho$ and $\omega_4 = \beta_2 - \rho$. Thus, there are two roots with negative real parts and $\Delta(J) > 0$. It follows that the steady state solutions derived from eqs. (6.50) - (6.53) constitute a saddle point equilibrium. The steady state property states that with the initial level of voting support and financial contribution received, that is, $m_i(0) = m_{i0}$ and $b_i(0) = b_{i0}$, $\lambda_{ii}(0)$, $\lambda_{ij}(0)$, $\psi_{ii}(0)$ and $\psi_{ij}(0)$ are such that the system converges to the steady state.

Let us now compare this with closed-loop feedback equilibrium solutions.

6.5.2 Closed-loop Solution

In deriving the closed-loop equilibrium, the strategy of the player is assumed to depend on its own time and state variable as well as the rival's, at every point of time. We analyze the closed-loop solution where it collapses to the open-loop solution. To investigate the closed-loop solution, the CVH of eq. (6.19) remains relevant. We derive the outcome of the non-cooperative game where each party maximizes its own discounted (constrained) utility as follows:

Lemma 1: *The closed-loop equilibrium coincide with the open-loop equilibrium.*

Proof: In order to find out the closed-loop Nash equilibria the first-order conditions are as follows (see also [Hämäläinen and Ehtamo, 1991](#), pp. 122-132; [Cellini and Lambertini, 2007](#); [Lambertini, 2014](#)):

$$\frac{\partial \mathcal{H}_i(t)}{\partial g_i(t)} = 0; \quad (6.56)$$

$$\dot{\lambda}_{ii}(t) + \rho \lambda_{ii}(t) = -\frac{\partial \mathcal{H}_i(t)}{\partial m_i(t)} - \frac{\partial \mathcal{H}_i(t)}{\partial g_j(t)} \frac{\partial g_j^*(t)}{\partial m_i(t)}; \quad (6.57)$$

$$\text{and, } \dot{\lambda}_{ij}(t) + \rho \lambda_{ij}(t) = -\frac{\partial \mathcal{H}_i(t)}{\partial m_j(t)} - \frac{\partial \mathcal{H}_i(t)}{\partial g_j(t)} \frac{\partial g_j^*(t)}{\partial m_j(t)}; \quad (6.58)$$

$$\text{Similarly, } \frac{\partial \mathcal{H}_i(t)}{\partial r_i(t)} = 0; \quad (6.59)$$

$$\dot{\psi}_{ii}(t) + \rho \psi_{ii}(t) = -\frac{\partial \mathcal{H}_i(t)}{\partial b_i(t)} - \frac{\partial \mathcal{H}_i(t)}{\partial r_j(t)} \frac{\partial r_j^*(t)}{\partial b_i(t)}; \quad (6.60)$$

$$\text{and, } \dot{\psi}_{ij}(t) + \rho \psi_{ij}(t) = -\frac{\partial \mathcal{H}_i(t)}{\partial b_j(t)} - \frac{\partial \mathcal{H}_i(t)}{\partial r_j(t)} \frac{\partial r_j^*(t)}{\partial b_j(t)}. \quad (6.61)$$

The initial conditions and the respective SVF are also same as in the case of open-loop equilibrium. Further, except the additional strategic interaction terms in the right hand sides of eqs. (6.57), (6.58), (6.60) and (6.61), the other necessary conditions are also the same as in case of the open-loop.

To prove Lemma 1, it is sufficient to observe that the first-order condition in $\mathcal{H}_i(t)$ w.r.t control variables $g_i(t)$ and $r_i(t)$, and the optimal solution of the co-state multipliers $\lambda_{ii}(t)$ and $\psi_{ii}(t)$ do not contain any state variables (Leitmann and Schmitendorf, 1978; Feichtinger, 1983; Fershtman, 1987⁴). Following Fershtman (1987) and Jørgensen (1983), we know that the necessary conditions for an open-loop Nash equilibrium are also sufficient. Moreover, there exists a large body of literature (Leitmann and Schmitendorf, 1978; Mehlmann and Willing, 1983; Dockner, Feichtinger, and Jørgensen, 1985), which state that, when the necessary and sufficient conditions for an open-loop Nash equilibrium are independent of the state variables, the open-loop Nash equilibrium is a degenerate closed-loop solution. Hence, the optimal solution derived from the partial derivative of the CVH of eq. (6.19). From eq. (6.20) and (6.23) for the admissible $\lambda_{ij}(t) = 0$, $\psi_{ij}(t) = 0$, and assuming that the solution of the control variables lies in the interior of the feasible control interval of $[0, \bar{g}]$ and $[0, \bar{r}]$, we get that:

$$\frac{\partial \mathcal{H}_i(t)}{\partial g_i(t)} = 0 \Rightarrow \lambda_{ii}(t) = \frac{\theta \phi_1}{\tau} g_i(t); \quad (6.62)$$

$$\frac{\partial \mathcal{H}_i(t)}{\partial r_i(t)} = 0 \Rightarrow \psi_{ii}(t) = (1 - \theta) \phi_2 r_i(t). \quad (6.63)$$

⁴If the Pontryagin-type necessary conditions for open-loop Nash that is, this is the case where the equilibrium conditions do not depend on the state variables, and consequently the open-loop Nash equilibrium, if it exists, is a degenerate closed-loop Nash equilibrium.

Moreover, the second-order partial derivatives are,

$$\frac{\partial^2 \mathcal{H}_i(t)}{\partial g_i^2(t)} = -\frac{\theta\phi_1}{\tau} < 0; \quad (6.64)$$

$$\frac{\partial^2 \mathcal{H}_i(t)}{\partial r_i^2(t)} = -(1-\theta)\phi_2 < 0. \quad (6.65)$$

Eqs. (6.64) and (6.65) imply that the CVH $\mathcal{H}_i(t)$, is concave. Intuitively, eqs. (6.62) and (6.63) state that the current value shadow prices of a marginal increase in the vote share and financial contribution or bribe of player i should be equal to their respective marginal effectiveness of expenditure on public good relative to tax and the regulatory benefit provided to SIG. Substituting the SVF conditions in eqs. (6.62) and (6.63) yields:

$$\lambda_{ii}(T) = \frac{\theta\phi_1}{\tau}g_i(T) \Rightarrow Z_1[m_i(T)] = \frac{\theta\phi_1}{\tau}g_i(T); \quad (6.66)$$

$$\psi_{ii}(T) = (1-\theta)\phi_2r_i(T) \Rightarrow Z_2[r_i(T)] = (1-\theta)\phi_2r_i(T). \quad (6.67)$$

Hence, at the terminal time period T , we obtain a unique Nash equilibrium $[g_i^*(T), g_j^*(T), r_i^*(T), r_j^*(T)]$. Note that, if $g_i^*(T)$ (relative to τ) and $r_i^*(T)$ are large then $Z_1[m_i(T)]$ and $Z_2[r_i(T)]$ are large, and the converse is also true. We find that, neither the optimal condition of eqs. (6.20) and (6.23) associated with the control variables, namely, $g_i(t)$ and $r_i(t)$, nor the adjoint conditions pertaining to $\lambda_{ii}(t)$ and $\psi_{ii}(t)$ in eqs. (6.21) and (6.24) contain any state variables. Hence, it is easy to eliminate the adjoint variables and derive a system of differential equations to solve for the Nash equilibrium $[g_i^*(t), g_j^*(t), r_i^*(t), r_j^*(t)]$. Differentiating eqs. (6.62) and (6.63) with respect to time, yields:

$$\dot{\lambda}_{ii}(t) = \frac{\theta\phi_1}{\tau}\dot{g}_i(t); \quad (6.68)$$

$$\dot{\psi}_{ii}(t) = (1-\theta)\phi_2\dot{r}_i(t). \quad (6.69)$$

Substituting eqs. (6.68) and (6.69) in the adjoint equations for $\lambda_{ii}(t)$ of eq. (6.21)

and $\psi_{ii}(t)$ of eq. (6.24) derives:

$$\frac{\theta\phi_1}{\tau}\dot{g}_i(t) = (\alpha_2 - \rho)\frac{\theta\phi_1}{\tau}g_i(t) - \theta\delta_i; \quad (6.70)$$

$$(1 - \theta)\phi_2\dot{r}_i(t) = (\beta_2 - \rho)(1 - \theta)\phi_2r_i(t) - \alpha_3\frac{\theta\phi_1}{\tau}g_i(t) - (1 - \theta)\gamma_i. \quad (6.71)$$

From the differential eqs. (6.70) and (6.71), and their symmetric equations, notice that the solutions $[g_i, g_j, r_i, r_j]$ will be independent of the initial states $[m_{i0}, m_{j0}, b_{i0}, b_{j0}]$. By substituting the solution for $[g_i, g_j, r_i, r_j]$ into the respective eqs. (6.62) and (6.63), we find that the solution for λ_{ii} and ψ_{ii} are also independent of the initial conditions $[m_{i0}, m_{j0}, b_{i0}, b_{j0}]$, and, accordingly, the state and adjoint equations are separable. Thus, $[g_i(t, m_{i0}), g_j(t, m_{j0}), r_i(t, b_{i0}), r_j(t, b_{j0})]$ are all independent of $[m_{i0}, m_{j0}, b_{i0}, b_{j0}]$, implying that the open-loop solution also qualifies for the closed-loop feedback equilibrium and is strongly time consistent.

6.6 The Social Optimum

Here, we consider the case of a benevolent social planner who chooses the vector of offers of expenditure on public good, $g_i(t)$, and regulatory benefit, $r_i(t)$, so as to maximize the collective welfare. This is simply the sum of the discounted pay-offs of both the parties under the constraints in eq. (6.4) and eq. (6.5).

Accordingly, the CVH for the social planner i , will be:

$$\begin{aligned} \mathcal{H}^{so}(t) = & \theta \left[\delta_i m_i(t) + \delta_j m_j(t) - \frac{\phi_1}{2} \frac{\{g_i(t)^2 + g_j(t)^2\}}{\tau} \right] \\ & + (1 - \theta) \left[\gamma_i b_i(t) + \gamma_j b_j(t) - \frac{\phi_2}{2} \{r_i(t)^2 + r_j(t)^2\} \right] \\ & + \lambda_i(t) [g_i(t) - \alpha_1 g_j(t) - \alpha_2 m_i(t) + \alpha_3 b_i(t)] \\ & + \lambda_j(t) [g_j(t) - \alpha_1 g_i(t) - \alpha_2 m_j(t) + \alpha_3 b_j(t)] \\ & + \psi_i(t) [r_i(t) - \beta_1 r_j(t) - \beta_2 b_i(t)] \\ & + \psi_j(t) [r_j(t) - \beta_1 r_i(t) - \beta_2 b_j(t)]. \end{aligned} \quad (6.72)$$

Finding the social optimum is reduced to the following proposition.

Proposition 6: *At the social optimum, party i 's offers of expenditure on public good and regulatory benefit are as follows: $g_i^{so} = \Omega_1[\delta_i - \alpha_1\delta_j]$ and $r_i^{so} = [\Omega_2(\gamma_i - \beta_1\gamma_j) + \Omega_2\Omega_3(\delta_i - \beta_1\delta_j)]$. The respective voting support received from the citizen voters and financial contribution from the SIG are: $m_i^{so} = \frac{1}{\alpha_2} \left[\Omega_2 \frac{\alpha_3}{\beta_2} [(1 + \beta_1^2)\gamma_i - 2\beta_1\gamma_j] \right] + \frac{1}{\alpha_2} \left[\Omega_1(1 + \alpha_1^2) + \Omega_2\Omega_3 \frac{\alpha_3}{\beta_2} (1 + \beta_1^2) \right] \delta_i - \frac{2}{\alpha_2} \left[(\Omega_1\alpha_1 + \Omega_2\Omega_3 \frac{\alpha_3\beta_1}{\beta_2}) \right] \delta_j$, and, $b_i^{so} = \frac{1}{\beta_2} [\Omega_2[(1 + \beta_1^2)\gamma_i - 2\beta_1\gamma_j] + \Omega_2\Omega_3[(1 + \beta_1^2)\delta_i - 2\beta_1\delta_j]]$, where, $\Omega_1 = \frac{\tau}{[\phi_1(\alpha_2 - \rho)]}$, $\Omega_2 = \frac{1}{[\phi_2(\beta_2 - \rho)]}$, $\Omega_3 = \frac{\theta\alpha_3}{[(1 - \theta)(\alpha_2 - \rho)]}$.*

Proof: The first-order conditions for the social optimum are as follows:

$$\frac{\partial \mathcal{H}^{so}(t)}{\partial g_i(t)} = 0 \Rightarrow \frac{\theta\phi_1}{\tau} g_i(t) = \lambda_i(t) - \alpha_1 \lambda_j(t); \quad (6.73)$$

$$\dot{\lambda}_i(t) + \rho \lambda_i(t) = -\frac{\partial \mathcal{H}^{so}(t)}{\partial m_i(t)} \Rightarrow \dot{\lambda}_i(t) = (\alpha_2 - \rho) \lambda_i(t) - \theta \delta_i; \quad (6.74)$$

$$\dot{\lambda}_j(t) + \rho \lambda_j(t) = -\frac{\partial \mathcal{H}^{so}(t)}{\partial m_j(t)} \Rightarrow \dot{\lambda}_j(t) = (\alpha_2 - \rho) \lambda_j(t) - \theta \delta_j; \quad (6.75)$$

$$\frac{\partial \mathcal{H}^{so}(t)}{\partial r_i(t)} = 0 \Rightarrow (1 - \theta) \phi_2 r_i(t) = \psi_i(t) - \beta_1 \psi_j(t); \quad (6.76)$$

$$\dot{\psi}_i(t) + \rho \psi_i(t) = -\frac{\partial \mathcal{H}^{so}}{\partial b_i(t)} \Rightarrow \dot{\psi}_i(t) = (\beta_2 - \rho) \psi_i(t) - (1 - \theta) \gamma_i - \alpha_3 \lambda_i(t); \quad (6.77)$$

$$\dot{\psi}_j(t) + \rho \psi_j(t) = -\frac{\partial \mathcal{H}^{so}}{\partial b_j(t)} \Rightarrow \dot{\psi}_j(t) = (\beta_2 - \rho) \psi_j(t) - (1 - \theta) \gamma_j - \alpha_3 \lambda_j(t). \quad (6.78)$$

Re-writing eqs. (6.73) and (6.76), we respectively obtain:

$$\lambda_i(t) = \frac{\theta\phi_1}{\tau} g_i(t) + \alpha_1 \lambda_j(t); \quad (6.79)$$

$$\psi_i(t) = (1 - \theta) \phi_2 r_i(t) + \beta_1 \psi_j(t). \quad (6.80)$$

From eq. (6.73), we know that:

$$\frac{\partial g_i(t)}{\partial t} \propto \frac{\partial \lambda_i(t)}{\partial t} - \alpha_1 \frac{\partial \lambda_j(t)}{\partial t}. \quad (6.81)$$

Further, from eq. (6.79) we obtain, $\lambda_i(t) = \frac{\theta\phi_1}{\tau} g_i(t) + \alpha_1 \lambda_j(t)$, and the analogous equation for the j^{th} player as $\lambda_j(t) = \frac{\theta\phi_1}{\tau} g_j(t) + \alpha_1 \lambda_i(t)$. Substituting for λ_j yields

the equation for λ_i to be,

$$\lambda_i(t) = \frac{\theta\phi_1}{\tau(1-\alpha_1^2)}[g_i(t) + \alpha_1 g_j(t)]. \quad (6.82)$$

Using eq. (6.82) together with eq. (6.74) and eq. (6.75), eq. (6.81) can be expressed as,

$$\frac{\partial g_i(t)}{\partial t} \propto (\alpha_2 - \rho) \frac{\theta\phi_1}{\tau} g_i(t) - \theta[\delta_i - \alpha_1 \delta_j]. \quad (6.83)$$

Along the steady state, for $\frac{\partial g_i(t)}{\partial t} = 0$, gives,

$$g_i^{so} = \frac{\tau}{\phi_1(\alpha_2 - \rho)}[\delta_i - \alpha_1 \delta_j]; \quad (6.84)$$

$$\Leftrightarrow g_i^{so} = \Omega_1[\delta_i - \alpha_1 \delta_j] \quad \text{where,} \quad \Omega_1 = \frac{\tau}{\phi_1(\alpha_2 - \rho)}. \quad (6.85)$$

The socially optimal solution, g_i^{so} , from eq. (6.85) can be substituted into eq. (6.4) to obtain the equilibrium level of $m_i(t)$. Assume, $\frac{\partial m_i(t)}{\partial t} = 0$ in eq. (6.4) yields:

$$m_i(t) = \frac{1}{\alpha_2} \left[\frac{\tau}{[\phi_1(\alpha_2 - \rho)]} (1 + \alpha_1^2) \delta_i - 2 \frac{\tau}{[\phi_1(\alpha_2 - \rho)]} \alpha_1 \delta_j + \alpha_3 b_i(t) \right]. \quad (6.86)$$

Similarly, the equilibrium steady state solutions for regulatory benefit and financial contribution received respectively by SIG and political parties/ politicians can be solved for as follows. Eq. (6.76) implies that,

$$\frac{\partial r_i}{\partial t} \propto \frac{\partial \psi_i(t)}{\partial t} - \beta_1 \frac{\partial \psi_j(t)}{\partial t}. \quad (6.87)$$

From eq. (6.80), we obtain $\psi_i(t) = (1 - \theta)\phi_2 r_i(t) + \beta_1 \psi_j(t)$, and an analogous symmetric expression for the j^{th} player will be $\psi_j(t) = (1 - \theta)\phi_2 r_j(t) + \beta_1 \psi_i(t)$. Substituting the expression for $\psi_j(t)$, the solution for $\psi_i(t)$ is,

$$\psi_i(t) = \frac{(1 - \theta)\phi_2}{(1 - \beta_1^2)} [r_i(t) + \beta_1 r_j(t)]. \quad (6.88)$$

Using eq. (6.88) and eq. (6.77) and eq. (6.78), eq. (6.87) can re-written as,

$$\Rightarrow \frac{\partial r_i(t)}{\partial t} \propto [(\beta_2 - \rho)(1 - \theta)\phi_2]r_i(t) - (1 - \theta)[\gamma_i - \beta_1\gamma_j] - \alpha_3[\lambda_i(t) - \beta_1\lambda_j(t)]. \quad (6.89)$$

Along the steady state, $\frac{\partial r_i(t)}{\partial t} = 0$, which yields the solution as,

$$r_i(t) = \frac{(1 - \theta)[\gamma_i - \beta_1\gamma_j] + \alpha_3[\lambda_i(t) - \beta_1\lambda_j(t)]}{[\phi_2(\beta_2 - \rho)(1 - \theta)]}. \quad (6.90)$$

From eq. (6.74), $\lambda_i(t) = \frac{\theta\delta_i}{(\alpha_2 - \rho)}$ at $\dot{\lambda}_i(t) = 0$. Substituting this in eq. (6.90) we get,

$$r_i^{so}(t) = \frac{1}{[\phi_2(\beta_2 - \rho)]} \left[(\gamma_i - \beta_1\gamma_j) + \frac{\theta\alpha_3}{[(1 - \theta)(\alpha_2 - \rho)]} (\delta_i - \beta_1\delta_j) \right]; \quad (6.91)$$

$$r_i^{so}(t) = [\Omega_2(\gamma_i - \beta_1\gamma_j) + \Omega_2\Omega_3(\delta_i - \beta_1\delta_j)]. \quad (6.92)$$

where, $\Omega_2 = \frac{1}{[\phi_2(\beta_2 - \rho)]}$ and $\Omega_3 = \frac{\theta\alpha_3}{[(1 - \theta)(\alpha_2 - \rho)]}$.

From eq. (6.5) we solve for $b_i(t)$ along the equilibrium path, where $\dot{b}_i(t) = 0$. Further, substituting for $r_i^{so}(t)$ from (6.92) in the equation for $b_i(t)$ yields its solution as:

$$b_i^{so} = \frac{1}{\beta_2} \left[\frac{1}{[\phi_2(\beta_2 - \rho)]} [(1 + \beta_1^2)\gamma_i - 2\beta_1\gamma_j] + \frac{1}{\beta_2} \left[\frac{1}{[\phi_2(\beta_2 - \rho)]} \frac{\theta\alpha_3}{[(1 - \theta)(\alpha_2 - \rho)]} [(1 + \beta_1^2)\delta_i - 2\beta_1\delta_j] \right]; \quad (6.93)$$

$$b_i^{so} = \frac{1}{\beta_2} [\Omega_2[(1 + \beta_1^2)\gamma_i - 2\beta_1\gamma_j] + \Omega_2\Omega_3[(1 + \beta_1^2)\delta_i - 2\beta_1\delta_j]]. \quad (6.94)$$

Finally, substituting eq. (6.93) into eq. (6.86) gives the solution as:

$$\Rightarrow m_i^{so}(t) = \frac{1}{\alpha_2} \left[\frac{1}{[\phi_2(\beta_2 - \rho)]} \frac{\alpha_3}{\beta_2} [(1 + \beta_1^2)\gamma_i - 2\beta_1\gamma_j] + \frac{1}{\alpha_2} \left[\frac{\tau}{[\phi_1(\alpha_2 - \rho)]} (1 + \alpha_1^2) + \frac{1}{[\phi_2(\beta_2 - \rho)]} \frac{\theta\alpha_3}{[(1 - \theta)(\alpha_2 - \rho)]} \frac{\alpha_3}{\beta_2} (1 + \beta_1^2) \right] \delta_i - \frac{2}{\alpha_2} \left[\frac{\tau}{[\phi_1(\alpha_2 - \rho)]} \alpha_1 + \frac{1}{[\phi_2(\beta_2 - \rho)]} \frac{\theta\alpha_3}{[(1 - \theta)(\alpha_2 - \rho)]} \frac{\alpha_3}{\beta_2} \beta_1 \right] \delta_j; \quad (6.95)$$

$$\begin{aligned}
\Rightarrow m_i^{so}(t) &= \frac{1}{\alpha_2} \left[\Omega_2 \frac{\alpha_3}{\beta_2} [(1 + \beta_1^2)\gamma_i - 2\beta_1\gamma_j] \right] \\
&+ \frac{1}{\alpha_2} \left[\Omega_1(1 + \alpha_1^2) + \Omega_2\Omega_3 \frac{\alpha_3}{\beta_2} (1 + \beta_1^2) \right] \delta_i \\
&- \frac{2}{\alpha_2} \left[\Omega_1\alpha_1 + \Omega_2\Omega_3 \frac{\alpha_3}{\beta_2} \beta_1 \right] \delta_j.
\end{aligned} \tag{6.96}$$

Thus, at the social optimum, the solutions for the key variables will be:

$$g_i^{so} = \Omega_1[\delta_i - \alpha_1\delta_j]; \tag{6.97}$$

$$r_i^{so} = [\Omega_2(\gamma_i - \beta_1\gamma_j) + \Omega_2\Omega_3(\delta_i - \beta_1\delta_j)]; \tag{6.98}$$

$$b_i^{so} = \frac{1}{\beta_2} [\Omega_2[(1 + \beta_1^2)\gamma_i - 2\beta_1\gamma_j] + \Omega_2\Omega_3[(1 + \beta_1^2)\delta_i - 2\beta_1\delta_j]]; \tag{6.99}$$

$$\begin{aligned}
m_i^{so} &= \frac{1}{\alpha_2} \left[\Omega_2 \frac{\alpha_3}{\beta_2} [(1 + \beta_1^2)\gamma_i - 2\beta_1\gamma_j] \right] \\
&+ \frac{1}{\alpha_2} \left[\Omega_1(1 + \alpha_1^2) + \Omega_2\Omega_3 \frac{\alpha_3}{\beta_2} (1 + \beta_1^2) \right] \delta_i \\
&- \frac{2}{\alpha_2} \left[\Omega_1\alpha_1 + \Omega_2\Omega_3 \frac{\alpha_3}{\beta_2} \beta_1 \right] \delta_j.
\end{aligned} \tag{6.100}$$

Notice that, the results of the social optimum are similar as that of private optimum. Since, $0 < \alpha_1, \beta_1 < 1$, we find that, as long as the $\delta_i > \delta_j$, where δ represent per unit voting support received, the offer of the expenditure on public good is higher by party i than party j . Similarly, if $\delta_i > \delta_j$ and per unit financial contribution garnered is such that, $\gamma_i > \gamma_j$, the steady state offer of financial contribution to party i and the offer of the regulatory benefit by i is higher than that for party j . Consequently, the steady state voting support for party i is higher than for party j .

The steady state equilibrium is analyzed below.

Proposition 7: *The solution for two control variables, namely, offers of expenditure (g) on public goods and regulatory benefit (r) to SIG, and the state variables, that is, voting support (m) and financial contributions (b), constitute a saddle point equilibrium.*

Proof: The following are the required equations of motion:

$$\dot{m}_i(t) = g_i(t) - \alpha_1 g_j(t) - \alpha_2 m_i(t) + \alpha_3 b_i(t); \quad (6.101)$$

$$\dot{b}_i(t) = r_i(t) - \beta_1 r_j(t) - \beta_2 b_i(t); \quad (6.102)$$

$$\dot{g}_i(t) = \frac{(\alpha_2 - \rho)\theta\phi_1}{\tau} g_i(t) - \frac{\tau}{\phi_1} [\delta_i - \alpha_1 \delta_j]; \quad (6.103)$$

$$\begin{aligned} \dot{r}_i(t) = & (\beta_2 - \rho)r_i(t) - \frac{1}{\phi_2} [\gamma_i - \beta_1 \gamma_j] \\ & + \frac{\theta}{1 - \theta} \frac{\phi_1}{\phi_2} \frac{\alpha_3}{\tau(1 - \alpha_1^2)} [(1 - \alpha_1 \beta_1)g_i(t) + (\beta_1 - \alpha_1)g_j(t)]. \end{aligned} \quad (6.104)$$

Like earlier, the stability analysis of the equation system (6.101)- (6.104) depends on the signs of the trace and determinant of the Jacobian matrix, which is:

$$J = \begin{bmatrix} -\alpha_2 & \alpha_3 & 1 & 0 \\ 0 & -\beta_2 & 0 & 1 \\ 0 & 0 & (\alpha_2 - \rho) & 0 \\ 0 & 0 & \frac{\theta}{1 - \theta} \frac{\phi_1}{\phi_2} \frac{\alpha_3(1 - \alpha_1 \beta_1)}{\tau(1 - \alpha_1^2)} & (\beta_2 - \rho) \end{bmatrix} \Bigg|_{(m_i^*, b_i^*, g_i^*, r_i^*)}. \quad (6.105)$$

We find that the trace $Tr(J) = -2\rho$ and the determinant $\Delta(J) = \alpha_2 \beta_2 [(\alpha_2 - \rho)(\beta_2 - \rho)]$. The solutions of the Jacobian matrix in the case of the social optimum are exactly the same as those in case of the open-loop saddle point steady state equilibrium. Thus, even the social optimum constitutes a saddle point equilibrium.

We now compare the solutions at the private with those at the social optimum.

6.7 Private versus Social Optimum

From the solutions to the offers of expenditure on public good by the two political parties, we have,

$$G^* = g_i^* + g_j^* = \Omega_1(\delta_i + \delta_j); \quad (6.106)$$

$$G^{so} = g_i^{so} + g_j^{so} = (1 - \alpha_1)[\Omega_1(\delta_i + \delta_j)] = (1 - \alpha_1)G^*. \quad (6.107)$$

Since $0 < \alpha_1 < 1$, we get that $G^* > G^{so}$. That is, political contest and non-cooperation between both the parties lead to higher aggregate offer of expenditure than what is socially desirable or derived from cooperation. In view of the solutions for party i being symmetric to those for party j , this result is also true for any single party.

The private and social optima for offer of regulatory benefit are as follows:

$$R^* = r_i^* + r_j^* = \Omega_2(\gamma_i + \gamma_j) + \Omega_2\Omega_3(\delta_i + \delta_j); \quad (6.108)$$

$$R^{so} = r_i^{so} + r_j^{so} = (1 - \beta_1)[\Omega_2(\gamma_i + \gamma_j) + \Omega_2\Omega_3(\delta_i + \delta_j)] = (1 - \beta_1)R^*. \quad (6.109)$$

Again, since $0 < \beta_1 < 1$, the private maximization of pay-offs by the parties with respect the regulatory benefit to SIG is also higher than the social optimum. Further, this is true for each party individually. Thus, non-cooperation leads to excessive offer of distortion of policies to render regulatory benefit as compared to cooperation.

The financial contributions are based on the offer of the regulatory benefit given by i and j . The financial contributions or bribes offered to the political parties i and j at the private and social optima are as follows:

$$B^* = b_i^* + b_j^* = \frac{1 - \beta_1}{\beta_2}[\Omega_2(\gamma_i + \gamma_j) + \Omega_2\Omega_3(\delta_i + \delta_j)]; \quad (6.110)$$

$$B^{so} = b_i^{so} + b_j^{so} = \frac{1 - \beta_1^2}{\beta_2}[\Omega_2(\gamma_i + \gamma_j) + \Omega_2\Omega_3(\delta_i + \delta_j)] = (1 - \beta_1)B^*. \quad (6.111)$$

Given $0 < \beta_1 < 1$, we again find that $B^* > B^{so}$. Thus, at the private optimum, the SIG if induced to operate higher levels of financial contributions to the individual parties, as well as in aggregate, that the socially desirable level.

Finally, voting support is garnered by both the political contestants, the incumbent and the opponent, based on the offer of the expenditure on public good and the

regulatory benefit rendered. We find that:

$$\begin{aligned} M^* &= m_i^* + m_j^* \\ &= \frac{1}{\alpha_2} \left[[(1 - \beta_1)\Omega_2 \frac{\alpha_3}{\beta_2}](\gamma_i + \gamma_j) + [(1 - \alpha_1)\Omega_1 + (1 - \beta_1)\Omega_2\Omega_3 \frac{\alpha_3}{\beta_2}](\delta_i + \delta_j) \right]; \end{aligned} \quad (6.112)$$

$$\begin{aligned} M^{so} &= m_i^{so} + m_j^{so} \\ &= \frac{1}{\alpha_2} \left[[(1 - \beta_1)^2\Omega_2 \frac{\alpha_3}{\beta_2}](\gamma_i + \gamma_j) + [(1 - \alpha_1)^2\Omega_1 + (1 - \beta_1)^2\Omega_2\Omega_3 \frac{\alpha_3}{\beta_2}](\delta_i + \delta_j) \right]. \end{aligned} \quad (6.113)$$

Once again, since $0 < \alpha_1 < 1$ and $0 < \beta_1 < 1$, we get that $(1 - \alpha_1)^2 < (1 - \alpha_1)$ and $(1 - \beta_1)^2 < (1 - \beta_1)$. Accordingly, $M^* > M^{so}$.

So, comparing the offer of expenditure on public good and regulatory benefit in return for voting support and financial contribution or bribe, between the private (non-cooperative) and social (cooperative) equilibria, we find that the former is higher than the latter in case of all the variables, namely, offers of expenditure on public good and regulatory benefit, and voting support and financial contribution. In fact, on the day of election, in period T , there is only one political party that comes to power and runs the government, and since players are committed to delivering on their promise, this result will hold for any single party as well. This lead to following proposition.

Proposition 8: *In equilibrium, the non-cooperative voting support of party i and the financial contributions offered to it, is higher than party j , if party i graciously offers larger government expenditure to citizen voters and higher regulatory benefit to SIG.*

6.8 Conclusion

Considering differential games, where there are two players or political parties/ politicians who contest an election in the presence of voters and SIG, the private optimum pay-offs for the individual players are maximized in a non-cooperative game context. The open-loop Nash equilibrium solutions imply that the commitment to its own plan of action by the parties, given the initial state and time, results in the same outcome even if the political parties change their strategy based on the state at every point in

time. Moreover, the closed-loop equilibrium collapses to the open-loop equilibrium, and it is found to be a saddle point equilibrium.

The offer of the expenditure on public good is higher if per unit voting support is higher. The offer of higher expenditure also requires correspondingly larger lump-sum tax and higher withdrawal of voters relative to the discount factor (at which the accumulation of net voting support and financial contribution received build up). Further, if the per unit voting support and financial contribution to party i is higher than party j and the voting support and financial contribution withdrawal is higher than the discount factor at which the accumulation of the net benefit of voting support and net financial contribution build up, political parties will offer a positive and higher expenditure on public good and render a positive regulatory benefit in order to seek a larger share of voting support and financial contribution. The lower per unit cost of the offer of expenditure on public good and regulatory benefit enhance the offer of higher expenditure and regulatory benefit to receive larger voting share and financial contribution. The higher financial contribution of bribe also provides higher regulatory benefit to the SIG and larger voting share to the political party. That is, the voting support and financial contribution received by party i will always be higher than party j 's if the per unit voting support and per unit financial contribution of bribe is higher for party i than party j .

Further, a comparison of the non-cooperative outcomes with those under cooperation entails that the solutions at the private optimum are always higher than at the social optimum. That is, the offer of the expenditure on the public good is exaggerated above the cooperative level, and hence, voters vote retrospectively to the party which overspends more. Similarly, the excessive distortion of private optimal regulatory benefit helps the political parties to receive higher financial contribution than what is socially desirable. Also, the optimal solutions at the private and social optimum constitute a steady state saddle point equilibria.

This research can be extended in several directions. One could proceed to the N player dynamic games to characterize the private and social optima. Apart from

this, one could strive to solve for the optimal number of political parties and the optimal date of election as endogenous variables. In addition, it would be interesting to analyze effect of such interactions between the corporate interest group and the political party in terms of distributive effects in the economy, particularly in terms of inequality and poverty. Will it further lead to plutocracy and oligarchy could be another interesting line of future enquiry.

CHAPTER 7

Conclusion

The discipline of economics and politics go hand in hand, and it is almost as if the two have been born together. A very relevant example that brings out this complementarity between economics and politics is the concept of democratic politics which is a platform where politics and economics interact with each other in various ways. This thesis is an attempt to study these interactions and dimensions in terms of formal economic analyses. The basic concept of interaction covered here are the political budget cycle, possibility of the convergence in opportunistic and partisan behaviors, political transfer cycles of the center to the states and the interaction of the special interest group with political parties/ politicians. Broadly, we have analyzed four major issues in the realm of political economic interactions (cycles). The scope of work of each is now discussed. First is the dynamics of the politics budget cycles (Chapter 3). This concept, mainly propounded by Nordhaus (1975), which states that the incumbent party or politician can opportunistically manipulate the economic policy to show a brighter side of the economy just before the election so as to attract more voters in its favor. This concept initially assumes the irrationality of voters where politicians can fool the voters' time-after-time. However, if the voters are rational and can understand the opportunistic behavior of the incumbent then the government can be punished in the subsequent election.

The second topic is an analysis of whether opportunist and partisan cycles converge (Chapter 4)? The concepts of opportunistic manipulations and partisan behavior have

already been theoretically explained in Chapter 3. Chapter 4 emphasizes whether these two cycles converge? The opportunistic manipulation refers to the idea of manipulating the economic variables before the elections so as to attract voters, whereas, partisan behavior implies adhering to the specific economic policies that party prefers during the electoral term. In fact, there might be a situation where the partisan behavior and the opportunistic behavior of the incumbent will converge during the election years.

The third topic pertains to an analysis of the center-state political transfer cycles (Chapter 5). This notion further resonates the idea of a political budget cycle, but the focus here is on the opportunistic manipulation of the transfer variables from the center to the states. This analysis covers both the national as well as the state level elections. The political transfer cycles have been traced in grants from the center and loan from the center.

The fourth formal analysis refers to the dynamics of the economics of the special interest politics and electoral competition (Chapter 6). The underlying notion is as if the democratic structure of the economy and special interest groups have evolved together and today they are de facto complementary to each other. The basic idea is as follows: two political parties compete for an election and, accordingly, they strategically interact with each other in the presence of voters and a special interest group. The political contestant offer expenditure on public good in exchange for voting support and interest group contributes in the election campaign of the political parties/ politicians prior to the election. Once these parties come to power they help the interest group in various ways such as: regulatory benefit, business and market opportunity etc.

The key findings of these four essays have been summarized following. Chapter 3 analyzes the opportunistic and partisan behavior of the incumbent by using budgetary deficit. The incumbents' economic behavior in terms of an expansionary fiscal policy is found to help win her/ him the election, however, in the presence of anti-incumbency, she/ he might be voted out. Further, an opportunist incumbent runs higher chances of

winning the elections albeit by imposing a higher cost on the economy. The optimum solution has been derived using the optimal control method under both, opportunism and partisan behavior, of the incumbent. Under the assumption of an iso-elastic kind of the net utility function from voting support vis-à-vis budgetary deficit, the citizen voters provide support to an opportunist as well as a partisan incumbent, but they reject the same when there is a very strong anti-incumbency factor in the opportunistic case. Given a large enough initial level of voting support (that is plausible for an incumbent politician in office), the path of both voting support and deficit is found to be positive and rising in the case of where anti-incumbency is absent. Moreover, to garner additional voting support, the opportunist incumbent has to incur an incrementally higher level of deficit as compared to the partisan incumbent. Thus, an opportunist incumbent is able to mobilize votes at the much higher cost of budgetary deficit to the economy. The voting support is positive and increasing even in the partisan case, but this will entail a lower cost in terms of budgetary deficit. However, the time path of both voting support and deficit will be falling when anti-incumbency exists.

Chapter 4 looks at the possibility of convergence in the partisan and opportunistic behavior of the incumbents. There are specific characteristics of political parties that define them as left, right and the centrist. Moreover, chapter concludes that political parties are not always tied to their ideology and partisan behavior. The basic findings of the paper indicate that ideological differences and its reflections in the economic policy are more visible at the national level elections and not at the assembly level. Similarly, the opportunistic behaviors of the parties were also more visible in the parliamentary election and not at the assembly elections. There exist strong political budget cycle in all the deficit heads (gross fiscal deficit, primary deficit and revenue deficit), aggregate expenditure, aggregate revenue, revenue receipts, tax revenue and sales tax with respect to the union level of elections. However, except capital expenditure and sales tax none of the variables show significant political budget cycles for the state level elections.

Further, analyzing the union elections of India approximated at the state level, we find that there is center-left-wing partisan and opportunist convergence in all the deficits heads (gross fiscal deficit, primary deficit and revenue deficit). There is strong center-left partisan and the opportunist government convergence in the aggregate expenditure and capital expenditure, whereas weak convergence of revenue expenditure in the case of the right-wing partisan and the opportunist government. Similarly, the center-left partisan behavior converges with the opportunist government in the case of revenue receipts, tax revenue and non-tax revenue. At the state level analysis, convergence is not very strong. That is, there is no convergence in opportunistic and partisan behavior of any party in deficits, whereas there is weak convergence in aggregate and revenue expenditure for the right-wing. Further, the right-wing opportunistic and partisan behavior converges in the case of revenue receipts and tax revenue.

For the union as well as the state level, in most of the cases, higher density of population shows higher deficit (gross fiscal deficit, primary deficit and revenue deficit), expenditure (aggregate expenditure, revenue expenditure, capital expenditure and social sector expenditure) and revenue (aggregate revenue, revenue receipts, capital receipts, tax revenue, non-tax revenue and sales tax). The GDP and GSDP growth rate (their lags) respectively show lower in the following variables: deficit, expenditure and revenue. Similarly, in most of the cases, if the center and state has the same ruling party then it shows lower deficit, expenditure and revenue, this is true also in the case of the coalition government at the union and the state level.

Chapter 5 is the third contribution which looks at the center-state political transfer cycles. The political transfer cycles are synonymous in the concept and its implications with political budget cycles however; former is seen as the transfers of specific components from the union government to its provinces. We analyze that whether these transfers are politically motivated and if it is, then whether it can help the central government in winning the election both at the national level and the state level. The transfers from the union to the states, such as Grants from the Center,

Loan from the Center and Tax devolution, involve three important institutions in the biggest democracy of the world, namely - Planning Commission (Now NITI Aayog), FC and the incumbent government. Although, FC is an independent constitutional entity, constituted every five years by the President of India, yet there is the scope for the central government under clause 3(c) of article 280 which reads, “any other matter referred to the commission by the president in the interest of sound finance”, to put certain restrictions on Finance Commission. Most of the components of grants from the center and tax devolution are under the purview of FC. However, the Planning Commission and central government play a greater role in the grants from the center and loan from the center.

To trace the political transfer cycles, we find that The political transfer cycles in loan from the center can be traced in the year before the election for the parliamentary elections but these occur in the year of the election for the assembly elections, whereas, grants from the center cycles are found in the year before the assembly elections only. No clear cycles have been traced in the case of tax devolution. This finding is similar to the literature on political budget cycles such as [Aidt, Veiga, and Veiga \(2011\)](#), [Drazen and Eslava \(2010\)](#), [Klomp and De Haan \(2013b\)](#), [Chortareas, Logothetis, and Papandreou \(2016\)](#) etc. A right-wing and coalition incumbent has the tendency to transfer less to the states, however, the former provides more grants to the states in the year of assembly elections. Additionally, if there exists the same party rule at the state level, or if the state is an ally of the center, the allied state receives more rewards from the center in the form of grants from the center and the loans from the center.

Next, we analyze whether such politically motivated transfers actually impact the probability of winning the election. Using the Logit estimation method, we find that there are not very strong results of politically motivated transfers that affect the victory of incumbent for both, parliamentary and assembly elections. However, the opportunistic manipulations of grants from the center in the year before the parliamentary election can help the incumbent to regain its power. Also, loans from

the center in levels generally help winning both, the parliamentary and assembly elections.

The remaining economic, political variables and political binaries are robust in terms of the key results. For instance, inflation is harmful for the incumbent as it increases the likelihood of losing the election. However, a higher voters' turnout is more likely to help in winning the election for the incumbent, and a more experienced government has a higher probability of winning the election. Similarly, a right-wing government is more likely to win the election, whereas the presence of a coalition government in general reduces the winning possibility in both, the parliamentary and the state elections.

Chapter 6 is the final contribution of this dissertation, which analyzes the strategic interaction between two political parties in the presence of voters and special interest group. This chapter extends the models of [Lambertini \(2001, 2014\)](#) and [Gavious and Mizrahi \(2002\)](#) in the following ways: (i) spending on election campaign alone is not enough to attract voters, rather, it also depends on the offer of the expenditure on public good and the structure of tax, which we model explicitly; (ii) [Lambertini \(2001, 2014\)](#) model campaign expenditure, but do not capture the source of it. In fact, often parties spend more than the amount stipulated by the election regulating authorities and, hence, the role of special interest group cannot be denied. In our case, we introduce the role of SIG in the objective function, where it not only contributes financially to the parties for campaign advertisements but also expects a quid pro quo of regulatory benefit. The departure from [Gavious and Mizrahi \(2002\)](#) is that, apart from the dynamic equation of the voting support for political parties/ politicians, our model also incorporates the dynamic constraint of financial contributions.

The specific contributions of this research are follows. It aims to analyze the positive concept of democratic electoral politics where two political parties – non-cooperatively or cooperatively – invest resources in election campaign over a finite horizon to win the consensus of the voters. In an optimal control set up, we analyze whether parties/ politicians overinvest individually than what would be the socially efficient level. For

this, we use the framework of [Lambertini \(2001, 2014\)](#), but differ from him as we extend the model to include an special interest group in the model that offers financial contributions (or bribes) to both the political parties, in return for an offer of a policy benefit. The players in our model are: two political parties/ politicians, a special interest group and citizen voters. The political parties/ politicians offer to spend on a public good that benefits the citizen voters as well as promise to provide regulatory benefit to special interest group, and in return, they receive political consensus from the citizen voters and financial contribution from the special interest group. The financial contributions could be potentially used for running the election campaign, which would affect the voters' consensus indirectly, which is modeled explicitly by us. We solve for the open-loop and closed-loop non-cooperative Nash equilibria from the perspective of the political parties, and compare these with the outcomes when the political party is a benevolent social planner that maximizes the joint welfare of both the parties.

Considering differential games, where there are two players or political parties/ politicians who contest an election in the presence of voters and special interest group, the private optimum pay-offs for the individual players are maximized in a non-cooperative game context. The open-loop Nash equilibrium solutions imply that the commitment to its own plan of action by the parties, given the initial state and time, results in the same outcome even if the political parties change their strategy based on the state at every point in time. Moreover, the closed-loop equilibrium collapses to the open-loop equilibrium, and it is found to be a saddle point equilibrium.

The offer of the expenditure on public good is higher if per unit voting support is higher. The offer of higher expenditure also requires correspondingly larger lump-sum tax and higher withdrawal of voters relative to the discount factor (at which the accumulation of net voting support and financial contribution received build up). Further, if the per unit voting support and financial contribution to first party is higher than second one and the voting support and financial contribution withdrawal is higher than the discount factor at which the accumulation of the net benefit of

voting support and net financial contribution build up, political parties will offer a positive and higher expenditure on public good and render a positive regulatory benefit in order to seek a larger share of voting support and financial contribution. The lower per unit cost of the offer of expenditure on public good and regulatory benefit enhance the offer of higher expenditure and regulatory benefit to receive larger voting share and financial contribution. The higher financial contribution of bribe also provides higher regulatory benefit to the special interest group and larger voting share to the political party. That is, the voting support and financial contribution received by first party will always be higher than second one if the unit voting support and unit financial contribution of bribe is higher for first party than the second one.

Further, a comparison of the non-cooperative outcomes with those under cooperation entails that the solutions at the private optimum are always higher than at the social optimum. That is, the offer of the expenditure on the public good is exaggerated above the cooperative level, and hence, voters vote retrospectively to the party which overspends more. Similarly, the excessive distortion of private optimal regulatory benefit helps the political parties to receive higher financial contribution than what is socially desirable. Also, the optimal solutions at the private and social optimum constitute a steady state saddle point equilibria.

The above research areas can be extended in many directions. For example beyond Chapter 3 we could pose the questions: what happens when the terminal date is not fixed in the case of the dynamics of political budget cycles, what happens to the solution when it is extended to the N player game and whether how the political budget cycle behaves in the presence of special interest group? Chapter 6) could be extended in terms of it to the N player dynamic game to analyze the private and social optima. Apart from this, one could analyze the optimal number of parties and optimal date of election by treating them as endogenous. This chapter could also be extended to address whether the relationships between the corporate interest group and the political party have distributive effects, particularly in terms of inequality and poverty? Will this further lead to plutocracy and oligarchy?

APPENDICES

Appendix A

Proofs Pertaining to Dynamics of Political Budget Cycle: Chapter 3

A.1 Proof of the Propositions

A.1.1 Proof of Proposition 1:

The Hamiltonian function is,

$$H = \left[\frac{[M(t) - \delta(D(t) - D^*)]^{1-\epsilon}}{(1-\epsilon)} \right] e^{-\rho t} + \lambda_M(t) [\alpha D(t) - \gamma M(t)] \quad (\text{A.1})$$

$$\begin{aligned} \frac{\partial H}{\partial D(t)} &= [M(t) - \delta(D(t) - D^*)]^{-\epsilon} e^{-\rho t} (-\delta) + \alpha \lambda_M(t) = 0 \\ &\Leftrightarrow \delta [M(t) - \delta(D(t) - D^*)]^{-\epsilon} e^{-\rho t} = \alpha \lambda_M(t) \end{aligned} \quad (\text{A.2})$$

$$\begin{aligned} \dot{\lambda}_M(t) &= -\frac{\partial H}{\partial M(t)} \Leftrightarrow \dot{\lambda}_M(t) = -[M(t) - \delta(D(t) - D^*)]^{-\epsilon} e^{-\rho t} + \gamma \lambda_M(t) \\ &\Leftrightarrow \dot{\lambda}_M(t) - \gamma \lambda_M(t) = -[M(t) - \delta(D(t) - D^*)]^{-\epsilon} e^{-\rho t} \end{aligned} \quad (\text{A.3})$$

and

$$\dot{M}(t) = \alpha D(t) - \gamma M(t) \quad (\text{A.4})$$

Substituting eq. (A.2) in eq. (A.3)

$$\dot{\lambda}_M(t) + \left(\frac{\alpha}{\delta} - \gamma \right) \lambda_M(t) = 0 \Leftrightarrow \lambda_M(t) = K_M e^{-\left(\frac{\alpha}{\delta} - \gamma\right)t} \quad (\text{A.5})$$

at $t=T$ and assuming $\lambda_M(T) = Z_m > 0$

$$\begin{aligned}\lambda_M(T) &= K_M e^{-(\frac{\alpha}{\delta}-\gamma)T} && \Leftrightarrow K_M = Z_m e^{-(\frac{\alpha}{\delta}-\gamma)(t-T)} \\ &&& \Leftrightarrow \lambda_M(t) = Z_m e^{-(\frac{\alpha}{\delta}-\gamma)(t-T)}\end{aligned}\quad (\text{A.6})$$

The transversality condition is; $\lambda_M(T) \geq 0 \Rightarrow [M(T) - M_{min}]\lambda_M(T) = 0$. Since $\lambda_M(T) = Z_m > 0 \Rightarrow M(T) = M_{min}$. Substituting eq(A6) in eq(A2) gives,

$$\begin{aligned}[M(t) - \delta(D(t) - D^*)]^{-\epsilon} e^{-\rho t} &= \frac{\alpha}{\delta} [Z_m e^{-(\frac{\alpha}{\delta}-\gamma)(t-T)}] \\ \Rightarrow \delta[D(t) - D^*] &= M(t) - \left(\frac{\alpha Z_m}{\delta}\right)^{-\frac{1}{\epsilon}} e^{-\frac{\rho}{\epsilon}t + \frac{(\alpha-\delta\gamma)}{\delta\epsilon}(t-T)}\end{aligned}\quad (\text{A.7})$$

$$\Rightarrow D(t) = \frac{1}{\delta} M(t) + D^* - \delta^{\frac{1-\epsilon}{\epsilon}} (\alpha Z_m)^{-\frac{1}{\epsilon}} e^{-\frac{\rho}{\epsilon}t + \frac{(\alpha-\delta\gamma)}{\delta\epsilon}(t-T)} \quad (\text{A.8})$$

$$\Rightarrow M(t) = \delta[D(t) - D^*] + \left(\frac{\alpha Z_m}{\delta}\right)^{-\frac{1}{\epsilon}} e^{-\frac{\rho}{\epsilon}t + \frac{(\alpha-\delta\gamma)}{\delta\epsilon}(t-T)} \quad (\text{A.9})$$

Substituting eq. (A.8) in eq. (A.4)

$$\dot{M}(t) - \left(\frac{\alpha - \delta\gamma}{\delta}\right)M(t) = -\left(\frac{\alpha}{\delta}\right)^{\frac{\epsilon-1}{\epsilon}} (Z_m)^{-\frac{1}{\epsilon}} e^{-\frac{\rho}{\epsilon}t + \frac{(\alpha-\delta\gamma)}{\delta\epsilon}(t-T)} + \alpha D^* \quad (\text{A.10})$$

Solving the differential equation (A.10) gives,

$$M(t) = \frac{\left(\frac{\alpha}{\delta}\right)^{\frac{\epsilon-1}{\epsilon}} (Z_m)^{-\frac{1}{\epsilon}} e^{-\frac{\rho}{\epsilon}t + \frac{(\alpha-\delta\gamma)}{\delta\epsilon}(t-T)}}{\frac{\epsilon-1}{\delta\epsilon}[(\alpha - \delta\gamma) + \frac{\delta\rho}{\epsilon-1}]} - \frac{\alpha\delta D^*}{\alpha - \delta\gamma} + C_M e^{(\frac{\alpha-\delta\gamma}{\delta})t} \quad (\text{A.11})$$

We find solution for $M(t)$ and the values of constant of integration (C_M) at $t = 0$ gives,

$$\begin{aligned}M(t) &= \left[M_0 + \frac{\alpha\delta D^*}{\alpha - \delta\gamma}\right] e^{(\frac{\alpha-\delta\gamma}{\delta})t} - \frac{\alpha\delta D^*}{\alpha - \delta\gamma} \\ &+ \frac{\left(\frac{\alpha}{\delta}\right)^{\frac{\epsilon-1}{\epsilon}} (Z_m)^{-\frac{1}{\epsilon}} e^{-\frac{(\alpha-\delta\gamma)}{\delta\epsilon}T}}{\frac{\epsilon-1}{\delta\epsilon}[(\alpha - \delta\gamma) + \frac{\delta\rho}{\epsilon-1}]} \left[e^{\frac{(\alpha-\delta\gamma-\delta\rho)}{\delta\epsilon}t} - e^{(\frac{\alpha-\delta\gamma}{\delta})t}\right] \\ &= \left[M_0 + \frac{\alpha\delta D^*}{\alpha - \delta\gamma}\right] e^{(\frac{\alpha-\delta\gamma}{\delta})t} - \frac{\alpha\delta D^*}{\alpha - \delta\gamma} \\ &+ \frac{\left(\frac{\alpha}{\delta}\right)^{\frac{\epsilon-1}{\epsilon}} (Z_m)^{-\frac{1}{\epsilon}} e^{-\frac{(\alpha-\delta\gamma)}{\delta\epsilon}(t-T)}}{\frac{\epsilon-1}{\delta\epsilon}} \left[\frac{e^{-\frac{\rho}{\epsilon}t} - e^{(\frac{\epsilon-1}{\delta\epsilon})(\alpha-\delta\gamma)t}}{(\alpha - \delta\gamma) + \frac{\delta\rho}{\epsilon-1}}\right]\end{aligned}\quad (\text{A.12})$$

$$\text{Where, } [C_M = M_0 - \frac{\left(\frac{\alpha}{\delta}\right)^{\frac{\epsilon-1}{\epsilon}} (Z_m)^{-\frac{1}{\epsilon}} e^{-\frac{(\alpha-\delta\gamma)}{\delta\epsilon}T}}{\frac{\epsilon-1}{\delta\epsilon}[(\alpha - \delta\gamma) + \frac{\delta\rho}{\epsilon-1}]} + \frac{\alpha\delta D^*}{(\alpha - \delta\gamma)}]$$

substituting eq. (A.12) in eq.(A.7)

$$D(t) - D^* = \frac{1}{\delta} M(t) - \delta^{\frac{1-\epsilon}{\epsilon}} (\alpha Z_m)^{-\frac{1}{\epsilon}} e^{-\frac{\rho}{\epsilon} t + \frac{(\alpha - \delta \gamma)}{\delta \epsilon} (t-T)} \quad (\text{A.13})$$

$$\begin{aligned} &= [M_0 + \frac{\alpha \delta D^*}{\alpha - \delta \gamma}] e^{\frac{(\alpha - \delta \gamma)}{\delta} t} - \frac{\alpha \delta D^*}{\alpha - \delta \gamma} + \frac{(\frac{\alpha}{\delta})^{\frac{\epsilon-1}{\epsilon}} (Z_m)^{-\frac{1}{\epsilon}} e^{-\frac{(\alpha - \delta \gamma)}{\delta \epsilon} T}}{\frac{\epsilon-1}{\delta \epsilon} [(\alpha - \delta \gamma) + \frac{\delta \rho}{\epsilon-1}]} [e^{\frac{(\alpha - \delta \gamma - \delta \rho)}{\delta \epsilon} t} - e^{\frac{(\alpha - \delta \gamma)}{\delta} t}] \\ &\quad - \delta^{\frac{1-\epsilon}{\epsilon}} (\alpha Z_m)^{-\frac{1}{\epsilon}} e^{-\frac{\rho}{\epsilon} t + \frac{(\alpha - \delta \gamma)}{\delta \epsilon} (t-T)} \end{aligned} \quad (\text{A.14})$$

$$\begin{aligned} &= [\frac{M_0}{\delta} + \frac{\alpha D^*}{\alpha - \delta \gamma}] e^{\frac{(\alpha - \delta \gamma)}{\delta} t} - \frac{\alpha D^*}{\alpha - \delta \gamma} \\ &\quad + \frac{\alpha Z_m^{-\frac{1}{\epsilon}} \delta^{\frac{1-\epsilon}{\epsilon}} e^{\frac{(\alpha - \delta \gamma)}{\delta \epsilon} (t-T)}}{\frac{\epsilon-1}{\delta \epsilon}} \left[\frac{\frac{\alpha}{\delta} [e^{-\frac{\rho}{\epsilon} t} - e^{\frac{\epsilon-1}{\delta \epsilon} (\alpha - \delta \gamma) t}] - \frac{\epsilon-1}{\delta \epsilon} [(\alpha - \delta \gamma) + \frac{\delta \rho}{\epsilon-1}] e^{-\frac{\rho}{\epsilon} t}}{[(\alpha - \delta \gamma) + \frac{\delta \rho}{\epsilon-1}]} \right] \end{aligned} \quad (\text{A.15})$$

A.1.2 Proof of Proposition 4:

(i) The path of voting support and deficit at $t = 0$ is as follows,

$$M(t) = M_0 \quad (\text{A.16})$$

$$D(t) - D^* = M_0 - \delta^{\frac{1-\epsilon}{\epsilon}} (\alpha Z_m)^{-\frac{1}{\epsilon}} e^{-\frac{(\alpha - \delta \gamma)}{\delta \epsilon} T} \quad (\text{A.17})$$

(ii) The path of voting support and deficit at $t = T$ is as follows,

$$\begin{aligned} M(T) &= [M_0 + \frac{\alpha \delta D^*}{\alpha - \delta \gamma}] e^{\frac{(\alpha - \delta \gamma)}{\delta} T} - \frac{\alpha \delta D^*}{\alpha - \delta \gamma} + \frac{(\frac{\alpha}{\delta})^{\frac{\epsilon-1}{\epsilon}} Z_m^{-\frac{1}{\epsilon}}}{\frac{\epsilon-1}{\delta \epsilon} [(\alpha - \delta \gamma) + \frac{\delta \rho}{\epsilon-1}]} [e^{-\frac{\rho}{\epsilon} T} - e^{\frac{(\epsilon-1)}{\epsilon} \frac{(\alpha - \delta \gamma)}{\delta} T}] \\ &= \Gamma_1 e^{\frac{(\alpha - \delta \gamma)}{\delta} T} - \Gamma_2 + \frac{\Gamma_3}{\frac{\epsilon-1}{\delta \epsilon}} \left[\frac{e^{-\frac{\rho}{\epsilon} T} - e^{\frac{(\epsilon-1)}{\epsilon} \frac{(\alpha - \delta \gamma)}{\delta} T}}{\Gamma_4} \right] \text{ and} \end{aligned} \quad (\text{A.18})$$

$$\begin{aligned} \eta(T) &= M(T) - \delta^{\frac{1-\epsilon}{\epsilon}} (\alpha Z_m)^{-\frac{1}{\epsilon}} e^{-\frac{\rho}{\epsilon} T} \\ &= [\frac{M_0}{\delta} + \frac{\alpha D^*}{\alpha - \delta \gamma}] e^{\frac{(\alpha - \delta \gamma)}{\delta} T} - \frac{\alpha D^*}{\alpha - \delta \gamma} \\ &\quad + \frac{(\alpha Z_m)^{-\frac{1}{\epsilon}} \delta^{\frac{1-\epsilon}{\epsilon}}}{\frac{\epsilon-1}{\delta \epsilon}} \left[\frac{\frac{\alpha}{\delta} (e^{-\frac{\rho}{\epsilon} T} - e^{\frac{\epsilon-1}{\delta \epsilon} (\alpha - \delta \gamma) T}) - \frac{\epsilon-1}{\delta \epsilon} [(\alpha - \delta \gamma) + \frac{\delta \rho}{\epsilon-1}] e^{-\frac{\rho}{\epsilon} T}}{[(\alpha - \delta \gamma) + \frac{\delta \rho}{\epsilon-1}]} \right] \\ &= \frac{\Gamma_1}{\delta} e^{\frac{(\alpha - \delta \gamma)}{\delta} T} - \frac{\Gamma_2}{\delta} + \frac{\frac{\Gamma_3}{\alpha}}{\frac{\epsilon-1}{\epsilon}} \left[\frac{[\frac{\alpha}{\delta} (e^{-\frac{\rho}{\epsilon} T} - e^{\frac{\epsilon-1}{\delta \epsilon} (\alpha - \delta \gamma) T})] - \frac{\epsilon-1}{\delta \epsilon} \Gamma_4 e^{-\frac{\rho}{\epsilon} T}}{\Gamma_4} \right] \end{aligned} \quad (\text{A.19})$$

This proves the proposition

Appendix B

Results Pertaining to the Convergence of Partisan and Opportunistic Cycles: Chapter 4

B.1 Data and Statistical Appendix

The sample for the study consists of 16 major states of India for 31 years from *1980-81* to *2010-11*. The data used in this study are collected from different sources covering economic, political, demography etc. This section present the data definition, sources, time period etc.

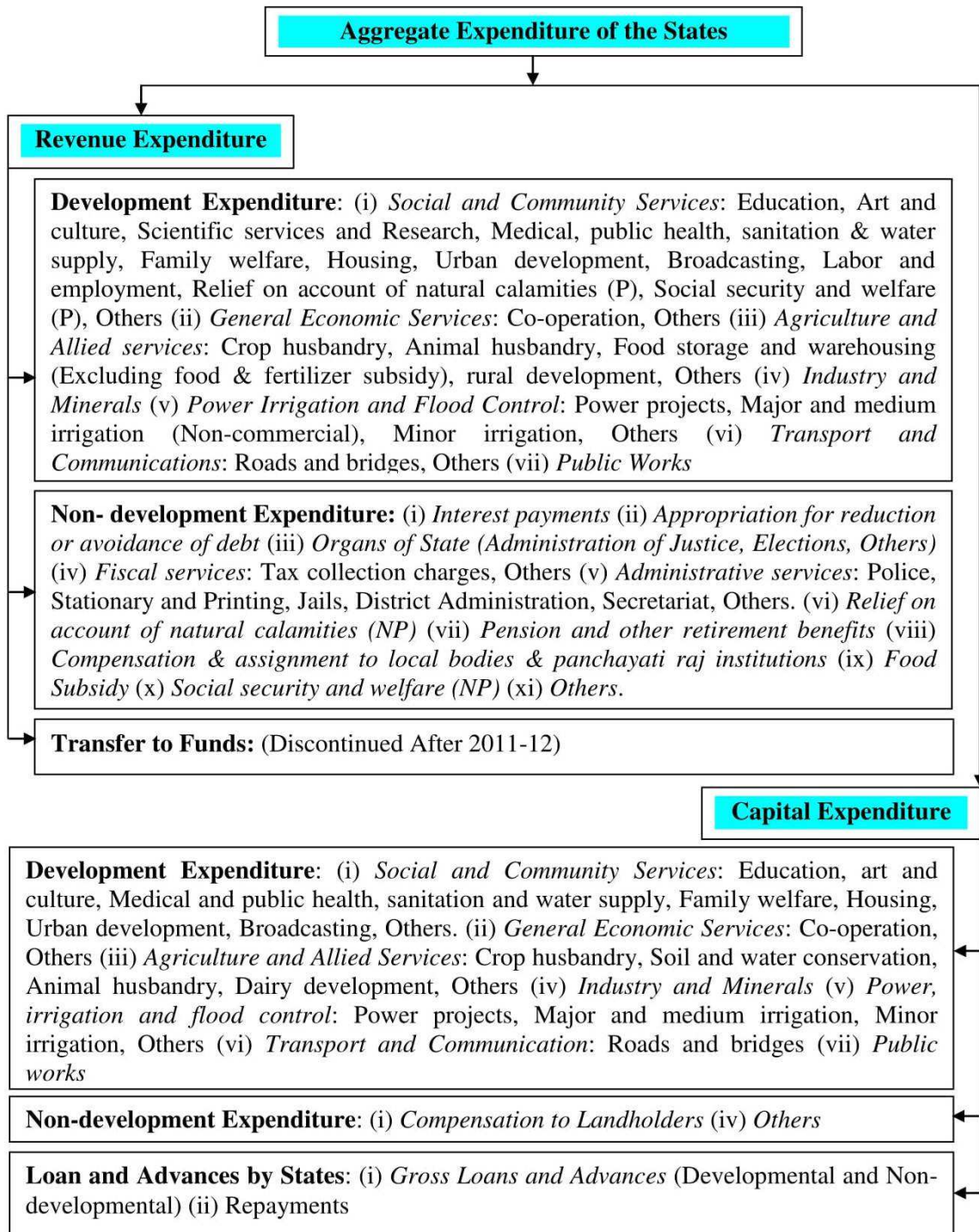
B.1.1 Data Definition

Figures [B.1](#) and [B.2](#) respectively present the definition and structure of the expenditure and revenue. The fragmentation of the expenditure and revenue variables are based on the data provided in the [Ministry of Finance, Government of India \(10.10.2014/2016\)](#).¹

The government of India has discontinued the reporting of plan and non-plan expenditure in its budget exercise and replaced it by revenue and capital expenditure. In general, the plan expenditure produces tangible assets in the economy for development and growth, hence, this is also known as the development expenditure. The non development expenditure are generally incurred in non tangible general services

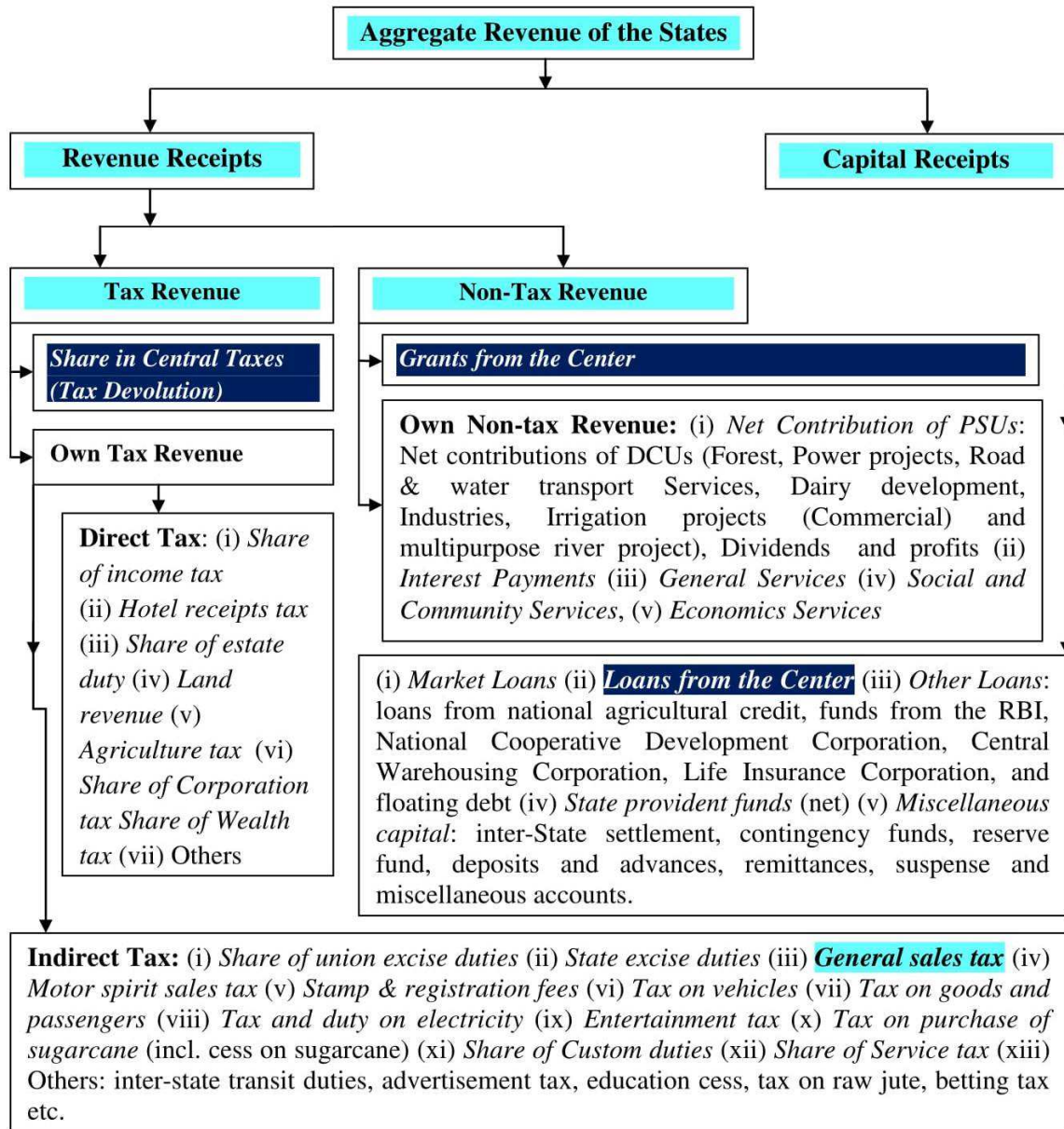
¹<http://dea.gov.in/indian-public-finance-statistics>

Figure B.1: Structure of the States' Expenditure



and activities of the government such as defense, external affairs, administrative expenditure, interest payments etc. Since, this chapter focus on the revenue and capital expenditure, Figures B.1 and B.2 provide their schematic presentation.

Figure B.2: Structure of the States' Revenue



The specific definitions and component heads of their expenditure, revenue, demographic and electoral variables are as follows:

- *Total Expenditure*: This is the sum total of the revenue expenditure and capital expenditure.
- *Revenue expenditure*: The revenue expenditure incurs for the normal running of the government departments and maintenance of services. For example,

salaries of the government employees, interest payments on loans taken from the central government, pensions, subsidies, grants, rural development, education and health and services etc.

- *Capital Expenditure*: It refers to those which either create an asset (for example, construction of railways, ports, roads, industrial buildings or equipments) or reduces liability (for example, repayment of loan etc). This expenditure incurs on long period development programmes, real capital and financial assets. This type of expenditure adds to the capital stock of the economy and raises its capacity to produce more in the future.
- *Social Sector Expenditure*: It includes expenditure on social services, rural development and food storage and warehousing under revenue expenditure, capital outlay and loans and advances by the State Governments.

In the schematic presentation of the total expenditure in Figure B.1, an another component of revenue expenditure that can be added in it is, *transfer to funds* whereas; *loans and advances* are added in the capital expenditure.

As in the case of total expenditure, the schematic presentation of the revenue has been shown in Figure B.2. The revenue collection can be defined as follows:

- *Total Revenue*: This is the sum total of the revenue receipts and capital receipts.
- *Revenue Receipts*: The revenue receipts consist of the tax revenue and non-tax revenue.
- *Capital Receipts*: The capital receipts includes market loans, loan from the center and other loans.
- *Tax Revenue*: It includes the state's share in central taxes (tax devolution), direct tax and indirect taxes.
- *Non-tax Revenue*: It includes grants from the center and other non-tax revenue.
- *Sales Tax*: This is the part of indirect tax calculated with the tax revenue head.

The total revenue can also be segregated as, *own revenue receipts (Own Tax Revenue + Own Non-tax Revenue)* and *other revenue receipts (tax devolution and grants from the center)* instead of *tax revenue* and *non-tax revenue*.

The pattern of the movement of the expenditure and revenue, consequent into fiscal deficit, surplus or the balanced budget. The deficit variables are defined as follows:

- *Gross Fiscal Deficit*: This is the difference between the aggregate expenditure and aggregate revenue. In our case, positive difference is defined as the fiscal deficit. This can also be defined as sum total of interest payments and primary deficits.
- *Primary Deficit*: This refers to difference between the current expenses of the government on goods and services and current revenue from all kinds of taxes net of transfers.
- *Revenue Deficit*: It refers to the difference between the actual net expenditure and the projected net expenditure.

The additional macroeconomic control variables used in this chapter are: all India nominal GDP growth rate ($Gdpg-i$) to analyze the fiscal cycles with respect to national level elections, and state level nominal GSDP growth rate ($Gsdpg-g$) to analyze the fiscal cycles with respect to assembly elections. Further, the specific definitions of the demographic and electoral variables are as follows:

- *Population Density (Density)*: This is measured as the total number of individual living in per unit area (per square kilometers in our case).
- *Political Ideology (Pidum)*: This refers to the principles, ideas, doctrines, symbols of a particular political party or group to direct the socio-economic order of a country, nation or a region.
- *Coalition Government (Cldum)*: This situation occurs when one political party could not secure the minimum threshold of majority to form the government then, the two or more than two political parties mutually decide to create a

coalition to form the government.

The detail of the sources and particular calculations of the variables have been presented in Table B.1. The dark blue colored variables such as state’s share in central taxes, grants from the center and loans from the center are the transfers provided by the union government to the states. The first two transfers are accounted under the head of the states’ revenue and the loan from the center contained in capital receipts. These transfers are done to the states for different economic activities. The detail definition of these transfers, and in our case the political motivation of these transfers have been studied in Chapter 5 and Appendix B.

B.1.2 Variables and Sources

Table B.1 provide the details about the variables, it’s sources and particular methods of calculation. This table consists of both the economic, demographic and electoral variables.

Table B.1: Variables and Sources

Variables	Period/Sources	Details
Net State Domestic Product (NSDP) at Current and constant Prices	1980-81 to 2010-11. From Ministry of Statistics and Programme Implementation, Government of India (10.10.2014/2016c) . http://mospi.nic.in/data	The data has been used to find out NSDP deflator keeping 1999-2000 as the base year to calculate the state wise inflation rate as $NSDP\ Deflator = \frac{NNSDP}{RNSDP}$ where, NNSDP is nominal and RNSDP is the real NSDP.

Table B.1: Variables and Sources

Variables	Period/Sources	Details
Per Capital Net State Domestic Product (PCNSDP) at current Prices	From Ministry of Statistics and Programme Implementation, Government of India (10.10.2014/2016d). http://mospi.nic.in/data	We used the formula, $Population = \frac{NSDP}{PCNSDP}$ to get the state-wise yearly population. The state-wise yearly population has been used to calculate the per capita nominal gross state domestic product.
Area, Density and Population of the States	1980-81 to 2010-11. From Ministry of Statistics and Programme Implementation, Government of India (12.02.2016/2016a). ²	Area of the state is measured as the area in squared km and $Density = \frac{TotalPopulation}{Area}$.
Gross State Domestic Product (GSDP) at Factor Cost (Current Price)	From Ministry of Statistics and Programme Implementation, Government of India (10.10.2014/2016e). http://mospi.nic.in/data	GSDP, GSDP per capita and GSDP growth rates have been used for the estimation purposes.
All India Gross Domestic Product (GDP) growth rate (Current Price)	From Ministry of Statistics and Programme Implementation, Government of India (10.10.2014/2016b). http://mospi.nic.in/data	The state invariant all India nominal GDP growth rate has been used for estimation purposes while looking at the national level elections.

²<http://www.mospi.gov.in/statistical-year-book-india/2016/171>

Table B.1: Variables and Sources

Variables	Period/Sources	Details
Inflation (All India-WPI)	1980-81 to 2010-11. From Handbook of Statistics on Indian Economy , Reserve Bank of India (RBI) (14.03.2013/2015). ³	WPI has been spliced to have one common base year (1999-2000 in this case) to calculate inflation rate.
Inflation (State level)	Calculated from state-wise NSDP deflator as, $Deflator = \frac{NNSDP}{RNSDP}$	Percentage change in NSDP Deflator is inflation rate (base year is 1999-2000).
Gross Fiscal deficit of the State Government	1980-81 to 2010-11. From NITI Aayog (National Institution for Transforming India), Government of India (08.01.2016/2016b). http://www.niti.gov.in/state-statistics	Gross Fiscal Deficit is the difference between aggregate disbursements (net of debt repayments) and recovery of loans and revenue receipts and non-debt capital receipts.
Interest Payment the State Government	1980-81 to 2010-11. From NITI Aayog (National Institution for Transforming India), Government of India (08.01.2016/2016c). http://www.niti.gov.in/state-statistics	This indicator has been used to calculate the primary deficit.

³<https://www.rbi.org.in/Scripts/Publications.aspx?Publication=Annual>

Table B.1: Variables and Sources

Variables	Period/Sources	Details
Primary Deficit of the State Government	1980-81 to 2010-11. From Handbook of Statistics on State Government Finances-2010, Reserve Bank of India (RBI) (14.03.2013/2013d) and updated for 2010-11. ⁴	This can also be calculated as Primary Deficit=Fiscal Deficit-Interest Payments.
Revenue deficit, revenue expenditure and revenue receipts of the State Government	From Handbook of Statistics on State Government Finances-2010, Reserve Bank of India (RBI) (14.03.2013/2013e) and updated for 2010-11. ⁵	This is calculated as, Revenue Deficit=Revenue expenditure-Revenue Receipts.
Capital Expenditure and Capital Receipt of the State Government	1980-81 to 2010-11. From NITI Aayog (National Institution for Transforming India), Government of India (08.01.2016/2016a). http://www.niti.gov.in/state-statistics	Capital expenditure incurs create asset, for example: construction of roads, railways, buildings, ports etc). It also reduces the liability.

⁴<https://www.rbi.org.in/Scripts/Publications.aspx?publication=Occasional>

⁵<https://www.rbi.org.in/Scripts/Publications.aspx?publication=Occasional>

Table B.1: Variables and Sources

Variables	Period/Sources	Details
Social Sector Expenditure of the State Government	1980-81 to 2010-11. From NITI Aayog (National Institution for Transforming India), Government of India (08.01.2016/2016d) . http://www.niti.gov.in/state-statistics	Social Sector Expenditure includes expenditure on social services, rural development and food storage and warehousing under revenue expenditure, capital outlay and loans and advances by the State Governments.
Tax revenue and Non-tax Revenue of the State Government	1980-81-2010-11. Various Issues, Handbook of Statistics on State Government Finances from 1980-81 to 1999-2000, and State Finances: A Study of State Budgets (14.03.2013/2013) .	Tax Revenue=Tax Devolution+Own Tax Revenue (Direct + Indirect Taxes) and Non-tax Revenue=Grants from the Center+Own Non-tax Revenue.
Sales Tax	1980-81 to 2010-11. From Handbook of Statistics on State Government Finances-2010, Reserve Bank of India (RBI) (14.03.2013/2013f) and updated for 2010-11. ⁶	Sales tax also includes VAT as and when introduced by States.

⁶<https://www.rbi.org.in/Scripts/Publications.aspx?publication=Occasional>

Table B.1: Variables and Sources

Variables	Period/Sources	Details
Own Tax and Own Non-tax Revenue of the State Govern- ment	1980-81 to 2010-11. From Handbook of Statistics on State Government Finances-2010 , Reserve Bank of India (RBI) (14.03.2013/2013c) and updated for 2010-11. ⁷	Own Revenue has been calculated as, Own Revenue=Own Tax Revenue+Own Non-tax Revenue.
Election Related Information for the National level and the State level Election	1951 to 2009. From Election Commission of India (ECI) (08.02.2014/2014). ⁸	Variables used are: Year/ Year before the Election for both national and the states, information on coalition and alliance (Newspaper articles), Number of Years Party was in Power, counted from the first election in India after independence.
Political Ideology	We used the ideological classification prepared by Dash and Raja (2012) and updated for AGP and LKDP	For National level election, classification has been done as binary (1 if right, 0 otherwise) whereas for the state level ideology has been ranked from 1 (extreme right) to 5 (extreme left).

⁷<https://www.rbi.org.in/Scripts/Publications.aspx?publication=Occasional>

⁸http://eci.nic.in/eci_main1/ElectionStatistics.aspx

B.2 Results

B.2.1 Descriptive Statistics

Table B.2 provides the basic statistical information for the economic and demographic variables and Table B.3 provide the electoral variables.

Table B.2: Descriptive Statistics of the Fiscal and Demographic Variables

	Electoral Variables	No. of Obs.	Mean	Std. Dev.	Min	Max
Fiscal Balance	Fiscal Deficit	496	3.924	2.111	-4.395	15.533
	Primary Deficit	496	1.527	1.834	-5.654	10.877
	Revenue Deficit	496	0.936	2.256	-13.10	9.556
Expenditure	Aggregate Expenditure	496	20.96	5.901	10.82	70.584
	Revenue Expenditure	496	16.15	4.092	9.459	35.611
	Capital Expenditure	496	18.22	29.12	0.590	252.37
	Social Expenditure	496	7.397	2.398	2.785	18.704
Revenue Receipts	Aggregate Receipts	496	20.895	5.813	5.438	68.617
	Revenue Receipts	496	15.208	4.301	7.542	37.859
	Capital Receipts	496	18.035	29.178	0.591	252.37
	Tax Revenue	496	10.000	2.021	5.972	19.222
	Non-Tax Revenue	496	5.208	3.793	1.320	29.746
	Sales Tax	496	3.807	1.232	1.232	6.607
	Own Tax Revenue	496	6.548	1.709	2.615	10.254
	Own Non-tax Revenue	496	2.260	1.407	0.320	13.23
	Own Revenue	496	8.808	2.197	4.201	20.428
Others (All India)	Growth Rate of GDP	496	14.359	3.091	7.670	19.51
	Inflation	496	7.236	3.255	3.270	18.20
Others (States)	Growth Rate of GSDP	496	14.492	6.979	-27.90	42.531
	Inflation	496	7.386	4.757	-3.318	53.063
	Density	496	396.82	243.19	76.895	1023.64

Source: Author's calculations

From 1980-81 to 2010-11, there are 496 data points for each variable. The macroeconomic variables have been normalized by dividing each of them by state-wise nominal gross state domestic product (GSDP). Both, Tables B.2 and B.3 provide the average,

standard deviation, minimum and maximum of the variables. The only variables for which all India data have been provided are those of GDP and inflation in Table B.2 (3rd and 4th row from below) and, hence, they are state invariant. The last two rows in Table B.2 provide the state level nominal gross state domestic product (GSDP) and inflation rate.

Table B.3: Descriptive Statistics of the Electoral Variables

	Electoral Variables	No. of Obs.	Mean	Std. Dev.	Min	Max
Union Elections	Pidum	496	0.193	0.395	0.000	1.000
	Allied	496	0.419	0.493	0.000	1.000
	Cldum	496	0.705	0.456	0.000	1.000
	Nypp	496	27.87	16.40	0.000	48.00
	Win Margin	496	0.050	0.607	-1.00	1.000
State Elections	Pidum	496	2.687	1.095	0.000	5.000
	Allied	496	0.431	0.495	0.000	1.000
	Cldum	496	0.403	0.491	0.000	1.000
	Nypp	496	0.491	14.79	1.000	55.00
	Win Margin	496	-0.133	.417	-0.800	0.750

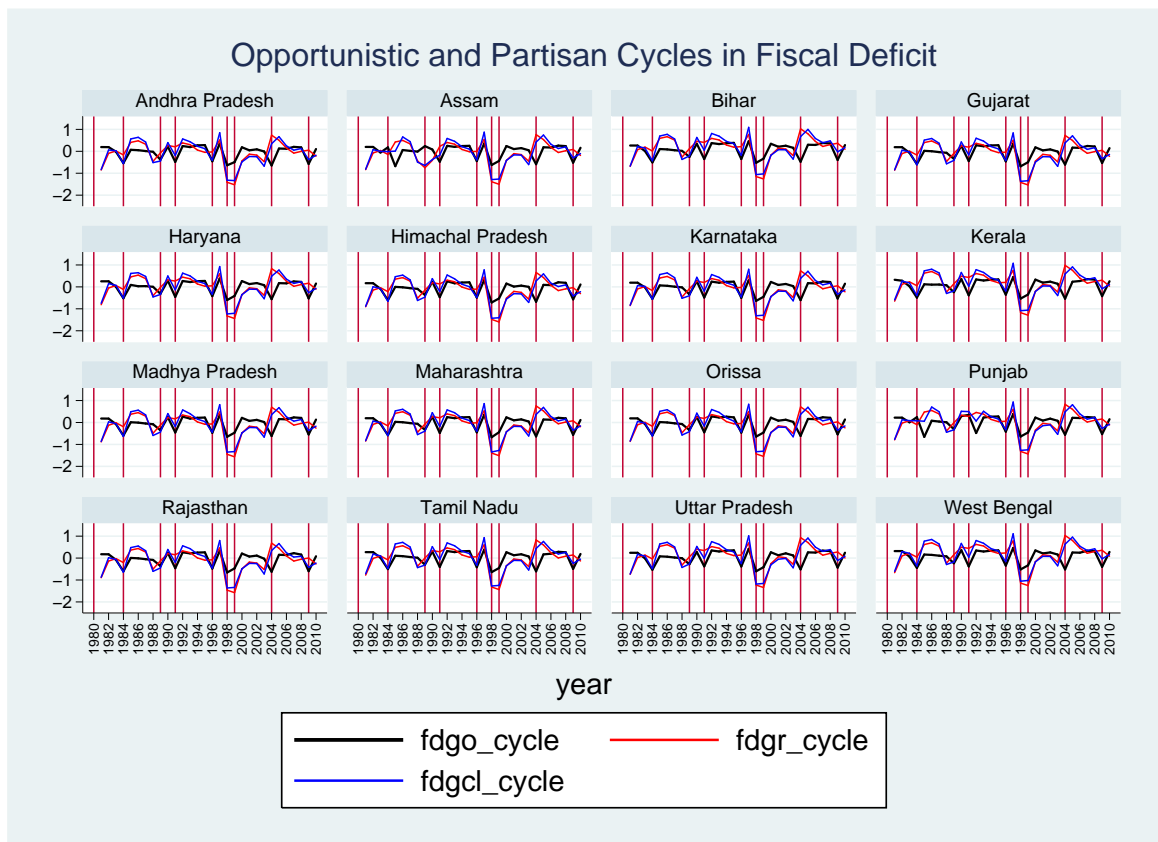
Source: Author's calculations

The following subsections provide the opportunistic and partisan cycles of the following variables: deficit (gross fiscal deficit, primary deficit and revenue deficit), expenditure (aggregate expenditure, revenue expenditure, capital expenditure and social sector expenditure), revenue (aggregate revenue, revenue receipts, capital receipts, tax revenue, non-tax revenue and sales tax). The x-axes represent the years, and vertical red bars within the figures represent the year of the election to capture the cyclical movement of deficit, expenditure and revenue variables in the year of the elections. The data are in fiscal year as 1980-81 to 2010-11 however, for convenience we represent the x-axes by the calendar years. In the figures from B.3 to B.16, the dark black line show the opportunistic cycles, red and blue colors respectively show the right-wing and center-left-wing partisan cycles.

B.2.2 Opportunistic and Partisan Cycles with Respect to Parliamentary Elections

Figures B.3 and B.4 (B.4a and B.4b) show the opportunistic and partisan cycles respectively in gross fiscal, primary, and revenue deficit, Figure B.5 (B.5a and B.5b) depicts opportunistic and partisan cycles of aggregate expenditure and revenue expenditure whereas, Figure B.6 (B.6a and B.6b) show the cycles for capital and social sector expenditure. Similarly, in the context of opportunistic and partisan cycles in revenues, Figure B.7 (B.7a and B.7b) show the aggregate revenue and revenue receipts cycles, B.8 (B.8a and B.8b) show the capital receipts and tax revenue cycles, and B.9 (B.9a and B.9b) show the cycles for non-tax revenue and sales tax.

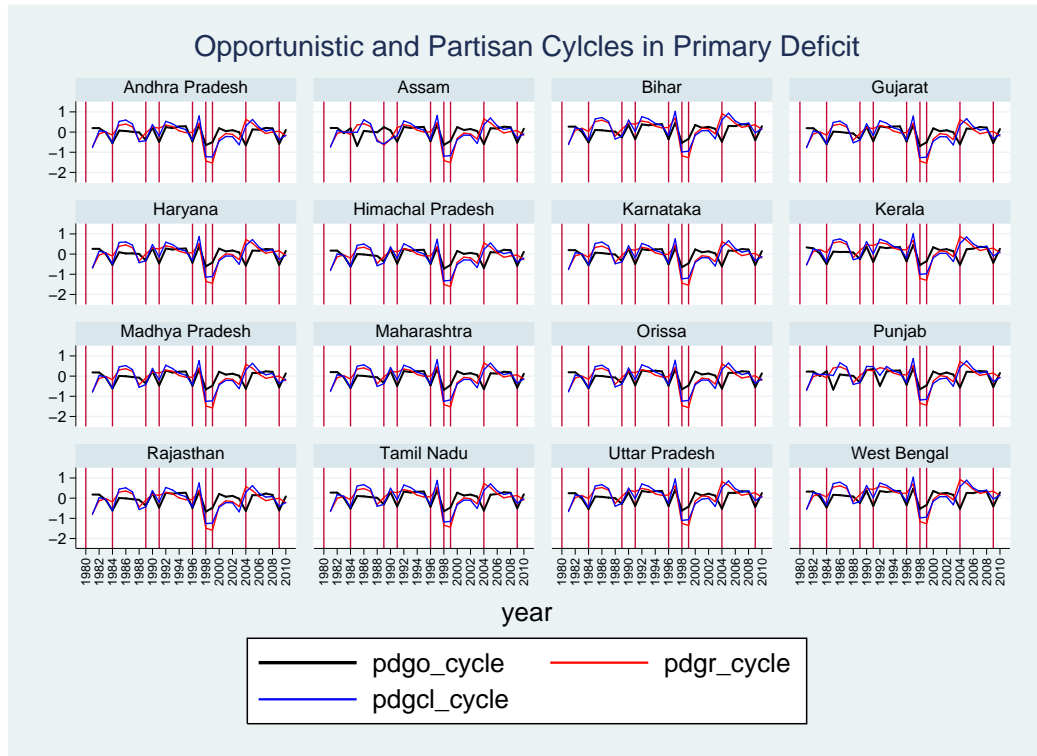
Figure B.3: Opportunistic and Partisan Cycles in Gross Fiscal Deficit (Parliamentary Elections)



Source: Author's calculations

Figure B.4: Opportunistic and Partisan Cycles in Revenue and Primary Deficits (Parliamentary Elections)

(a) Primary Deficit



(b) Revenue Deficit

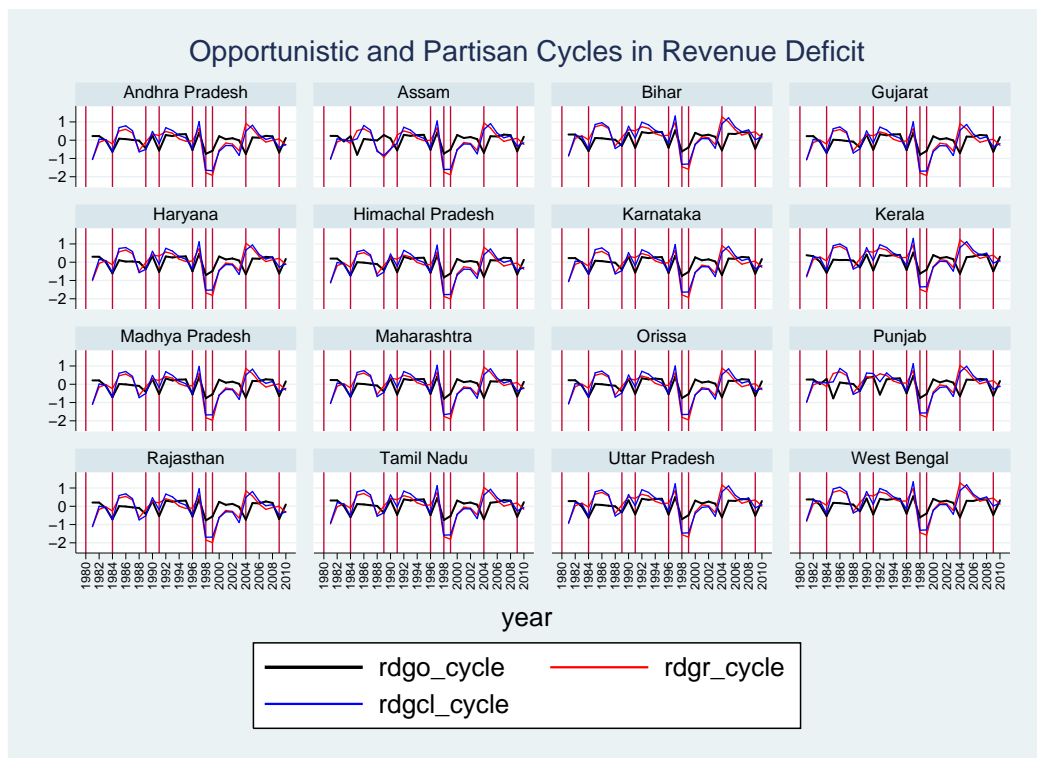
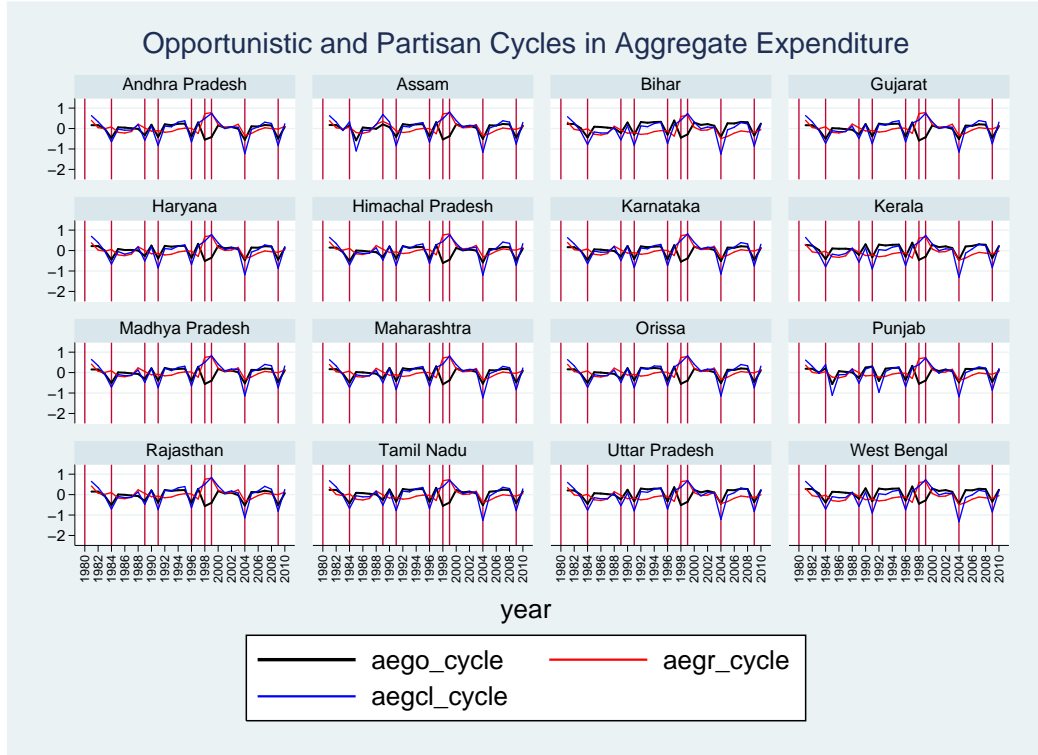


Figure B.5: Opportunistic and Partisan Cycles in Aggregate and Revenue Expenditures (Parliamentary Elections)

(a) Aggregate Expenditure



(b) Revenue Expenditure

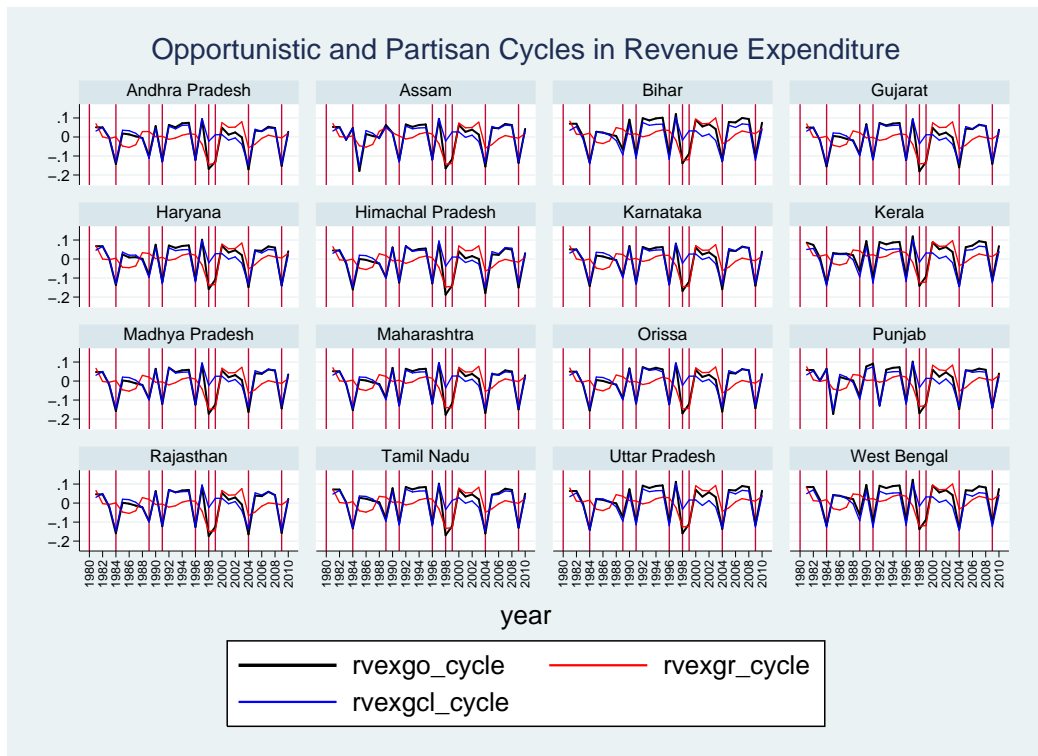
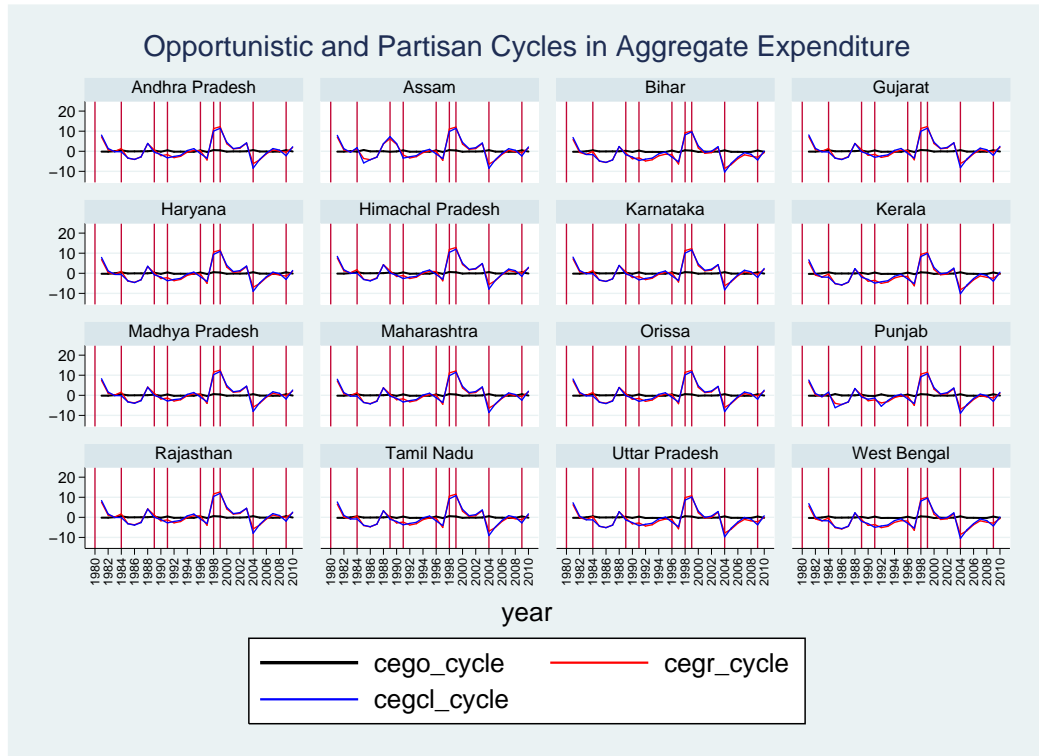


Figure B.6: Opportunistic and Partisan Cycles in Capital and Social Expenditures (Parliamentary Elections)

(a) Capital Expenditure



(b) Social Expenditure

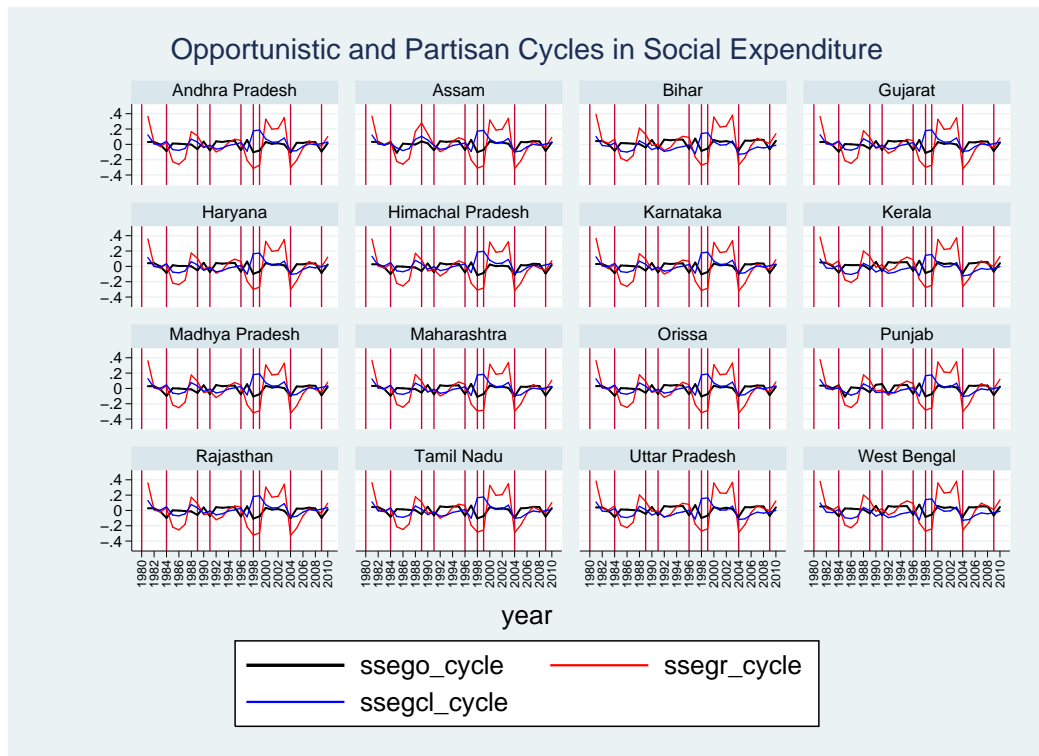
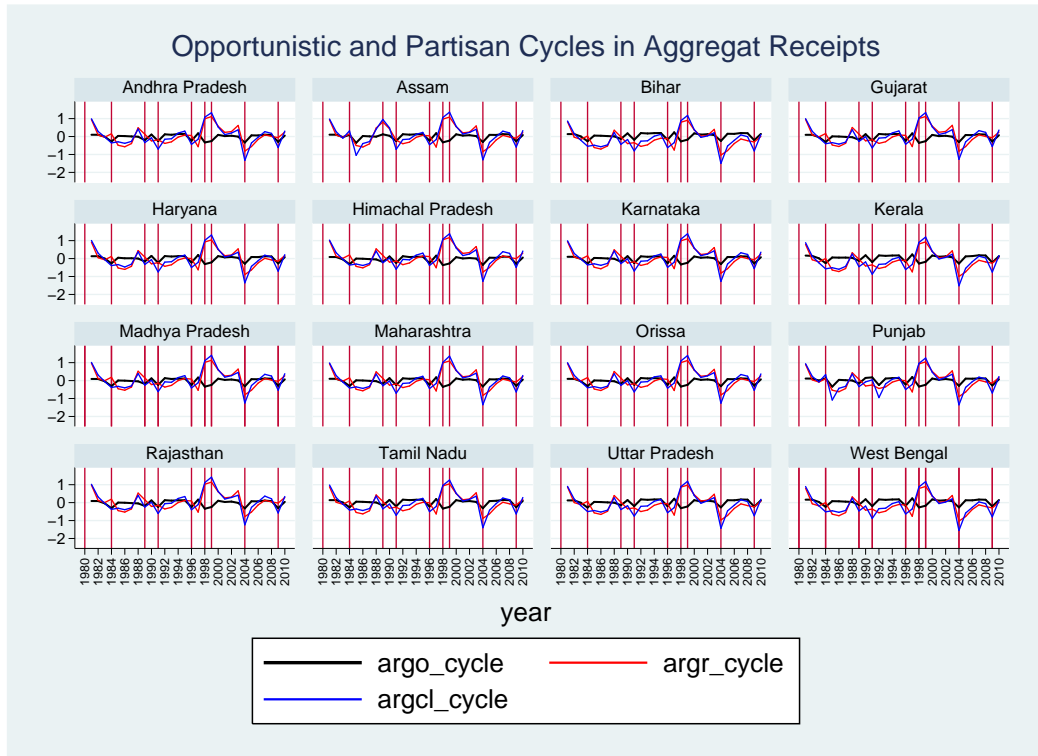


Figure B.7: Opportunistic and Partisan Cycles in Aggregate and Revenue Receipts (Parliamentary Elections)

(a) Aggregate Revenue



(b) Revenue Receipts

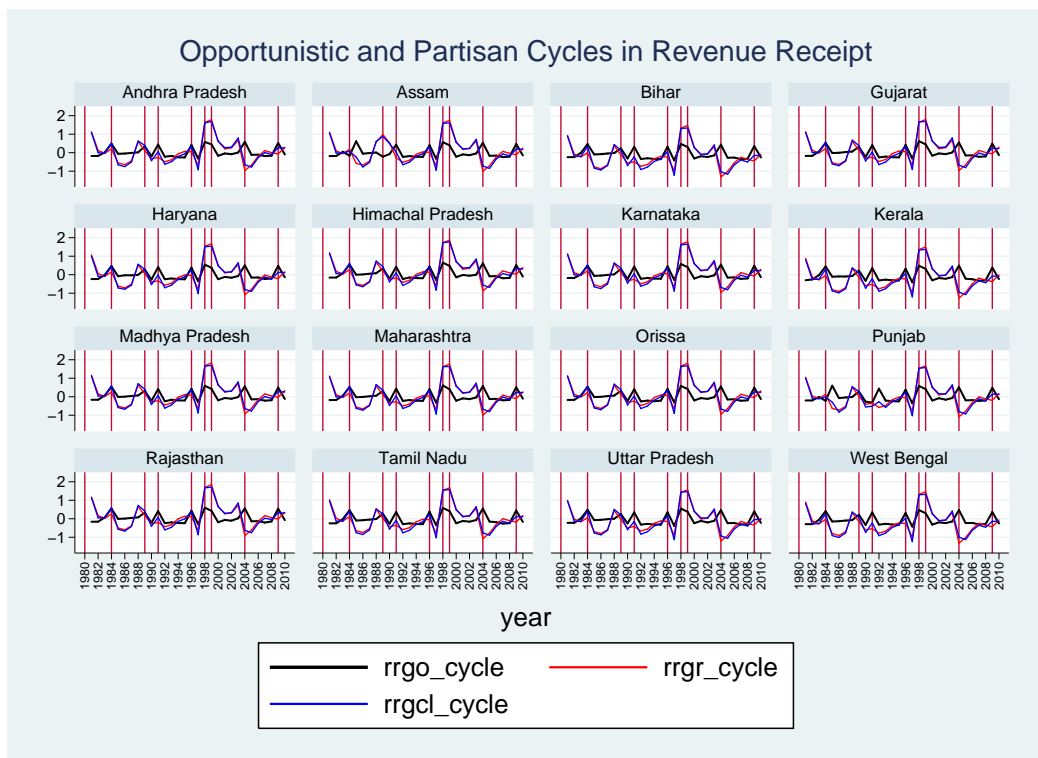
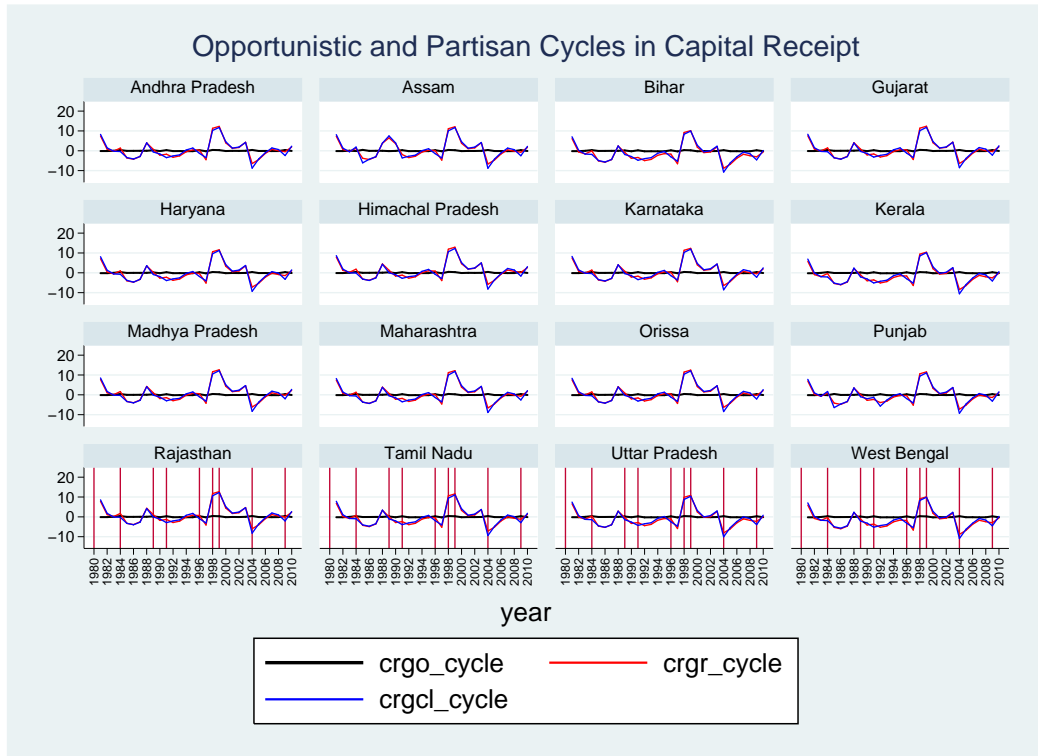


Figure B.8: Opportunistic and Partisan Cycles in Capital Receipts and Tax Revenue (Parliamentary Elections)

(a) Capital Receipts



(b) Tax Revenue

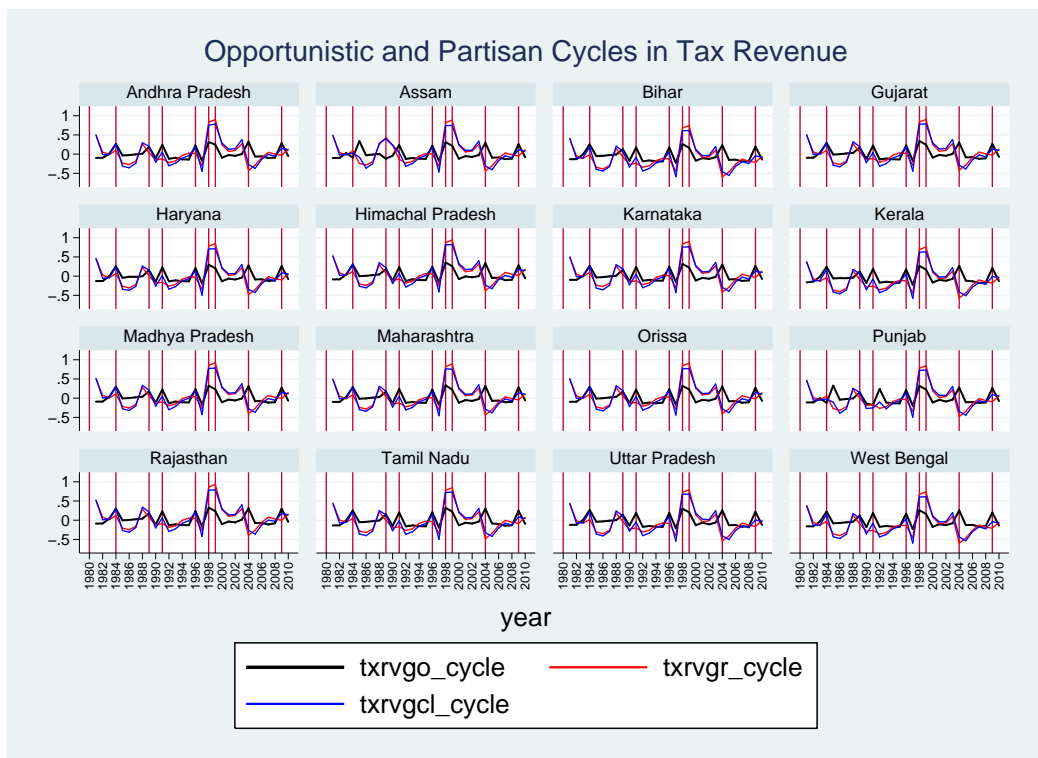
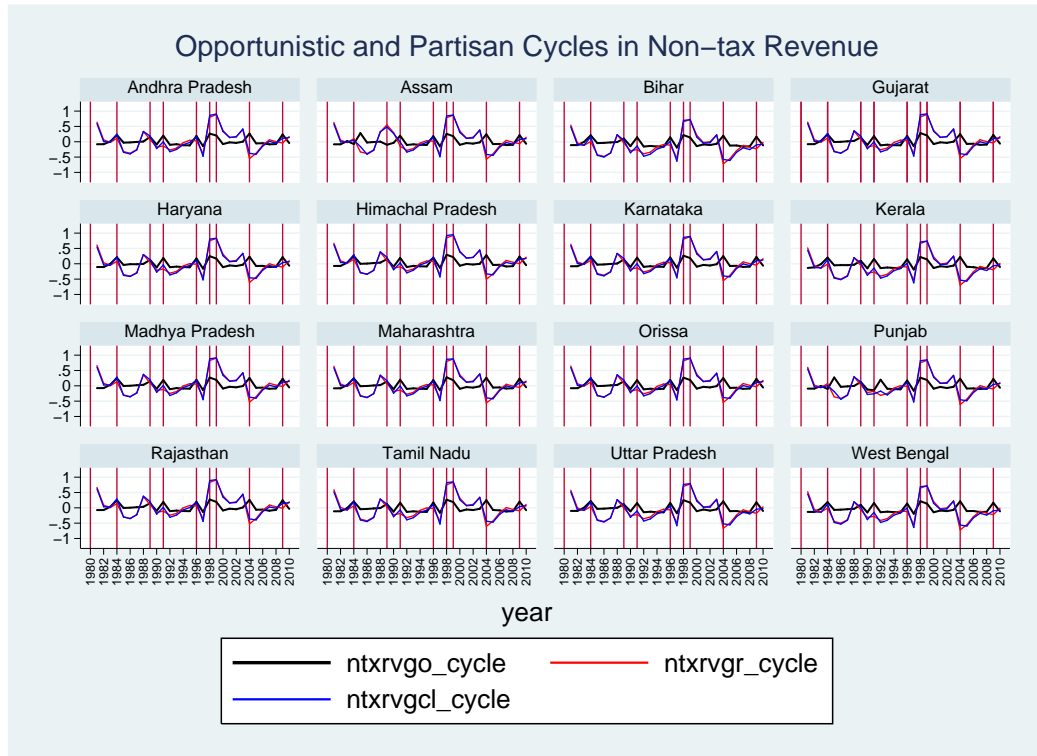
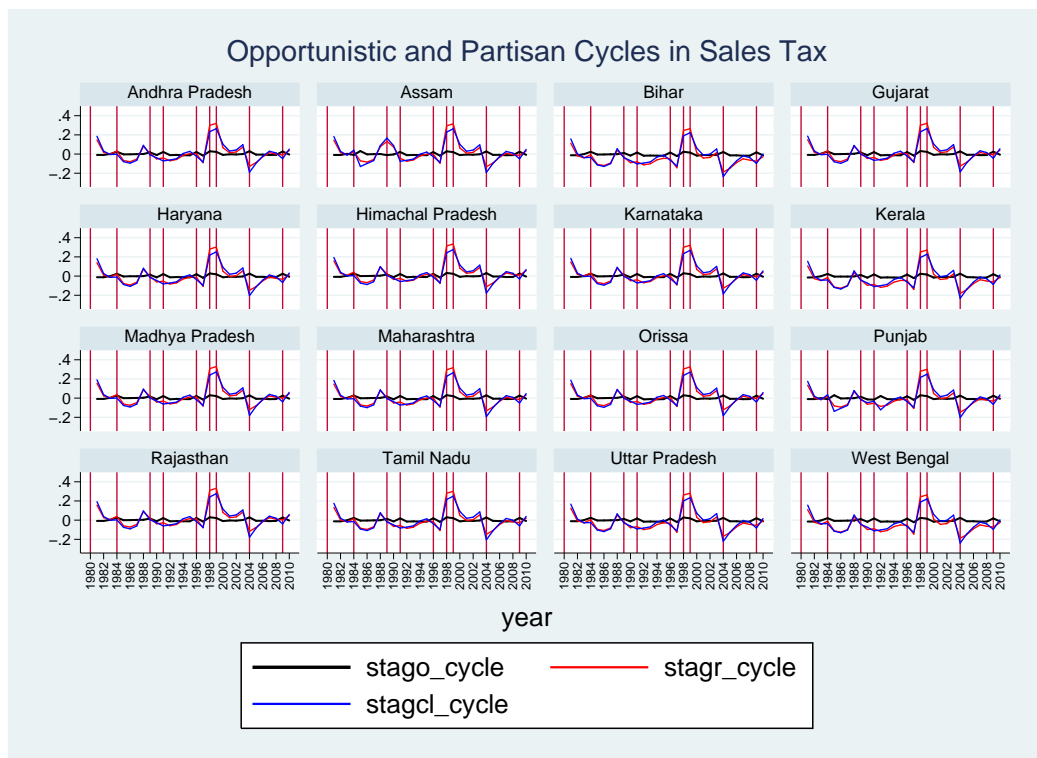


Figure B.9: Opportunistic and Partisan Cycles in Non-tax Revenue and Sales Tax (Parliamentary Elections)

(a) Non-tax Revenue



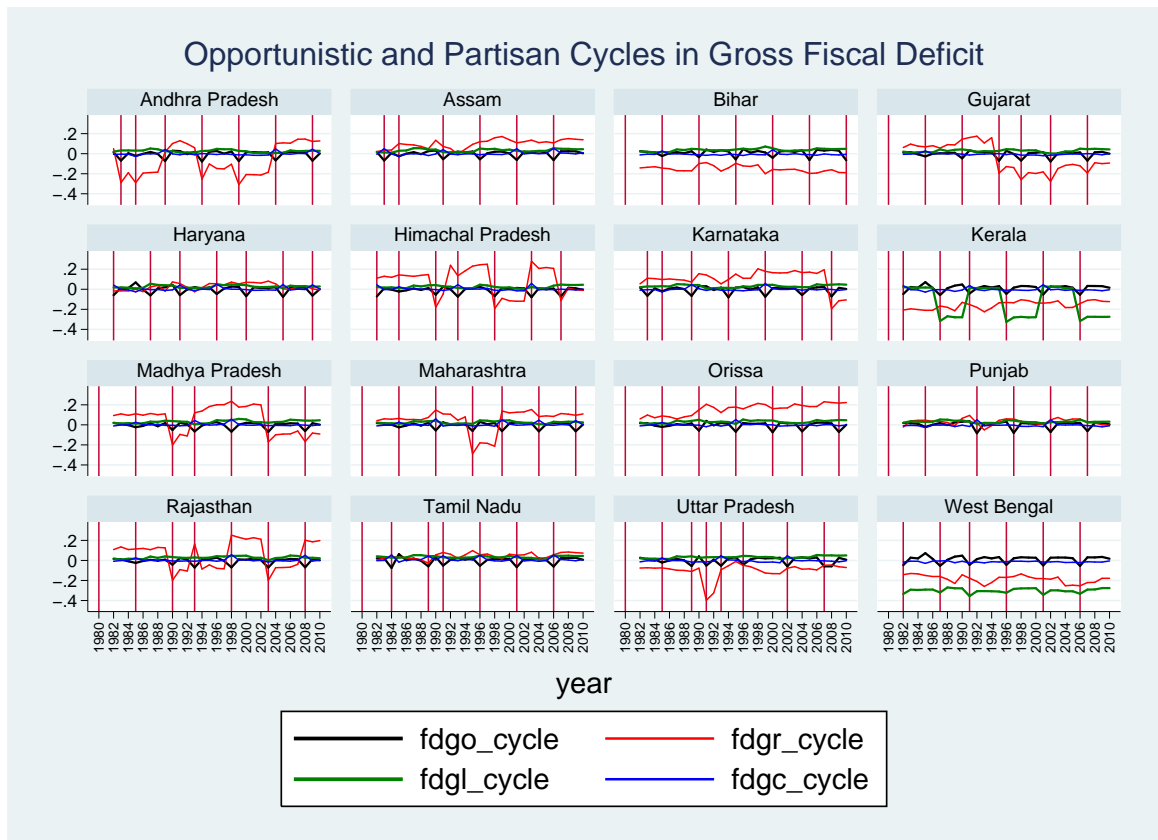
(b) Sales Tax



B.2.3 Opportunistic and Partisan Cycles with Respect to Assembly Elections

The following figures pertain to the assembly elections. Figures B.10 and B.11 (B.11a and B.11b) show the opportunistic and partisan cycles respectively in gross fiscal deficit, primary deficit and revenue deficit, Figure B.12 (B.12a and B.12b) pertains to opportunistic and partisan cycles of aggregate expenditure and revenue expenditure whereas, Figure B.13 (B.13a and B.13b) show the cycles for capital and social sector expenditure. Similarly in the context of opportunistic and partisan cycles, Figure B.14 (B.14a and B.14b) show the aggregate revenue and revenue receipts cycles, B.15 (B.15a and B.15b) show the capital receipts and tax revenue cycles, and B.16 (B.16a and B.16b) show the cycles for non-tax revenue and sales tax.

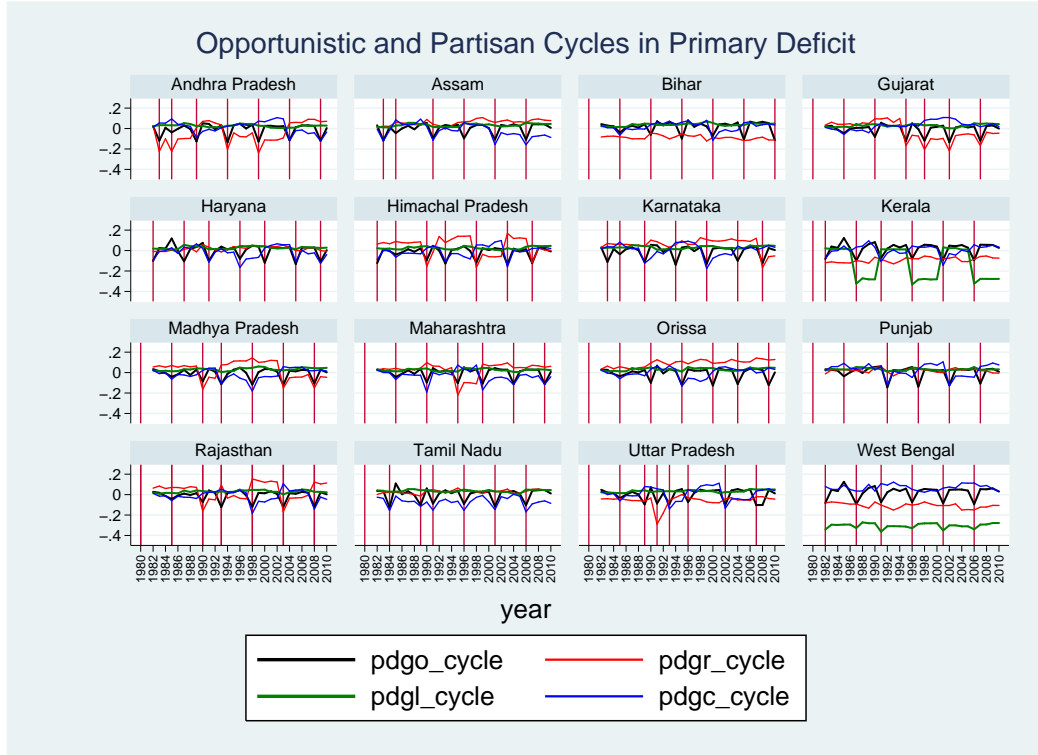
Figure B.10: Opportunistic and Partisan Cycles in Gross Fiscal Deficit (Assembly Elections)



Source: Author's calculations

Figure B.11: Opportunistic and Partisan Cycles in Revenue and Primary Deficits (Assembly Elections)

(a) Primary Deficit



(b) Revenue Deficit

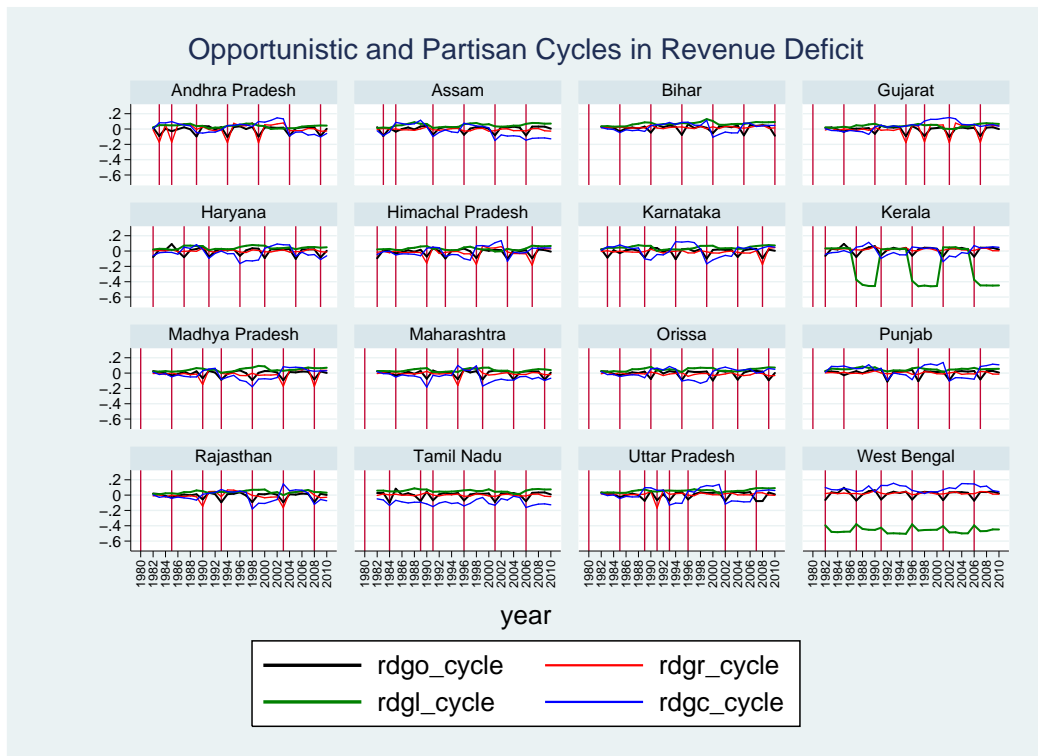
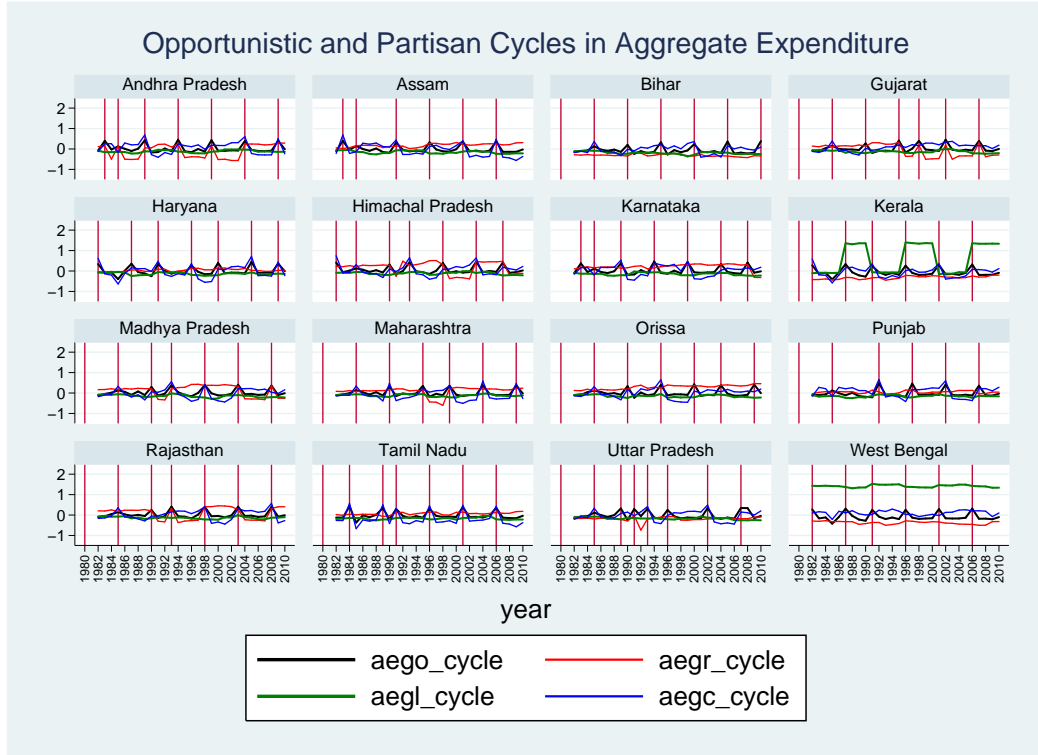


Figure B.12: Opportunistic and Partisan Cycles in Aggregate and Revenue Expenditures (Assembly Elections)

(a) Aggregate Expenditure



(b) Revenue Expenditure

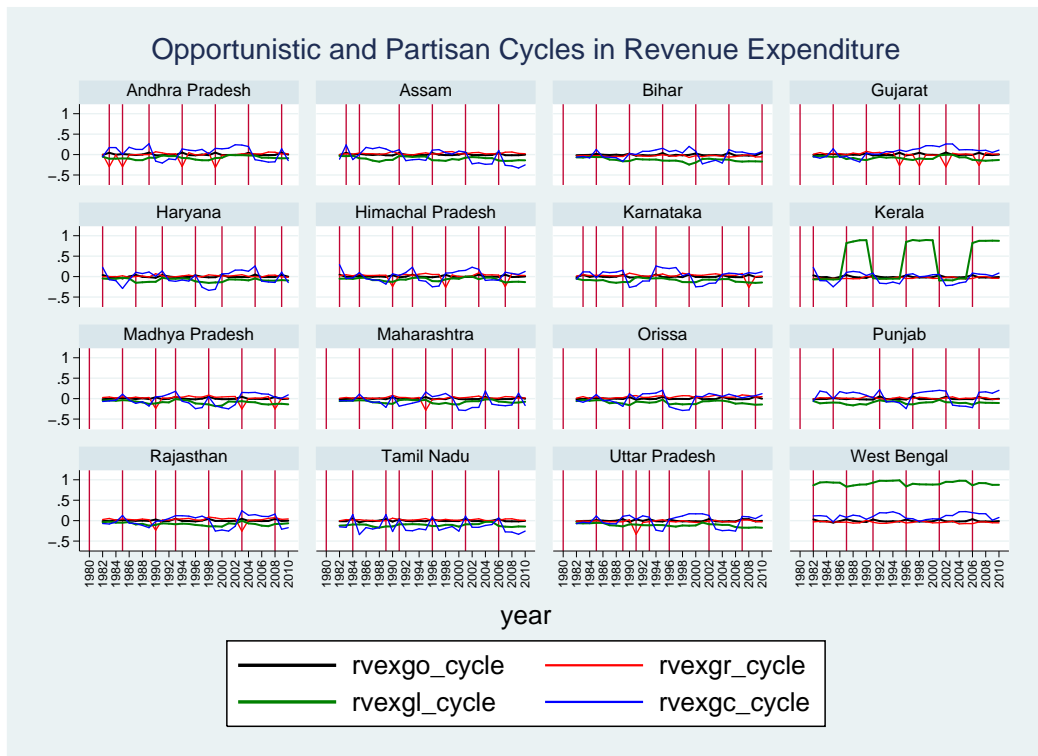
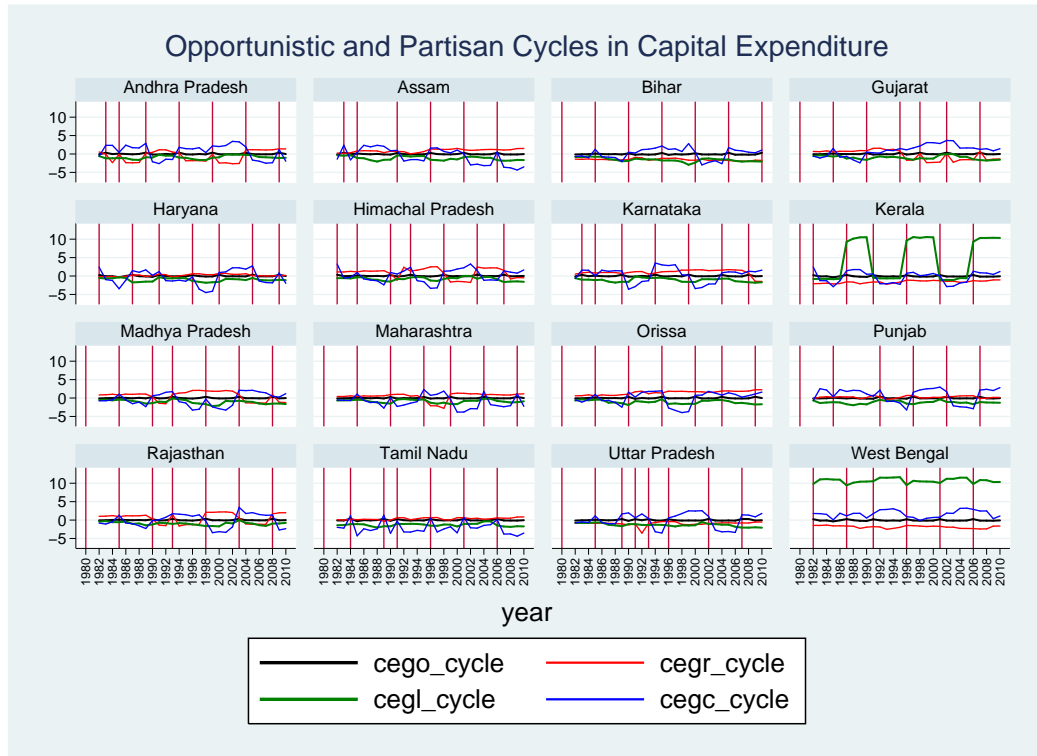


Figure B.13: Opportunistic and Partisan Cycles in Capital and Social Expenditures (Assembly Elections)

(a) Capital Expenditure



(b) Social Expenditure

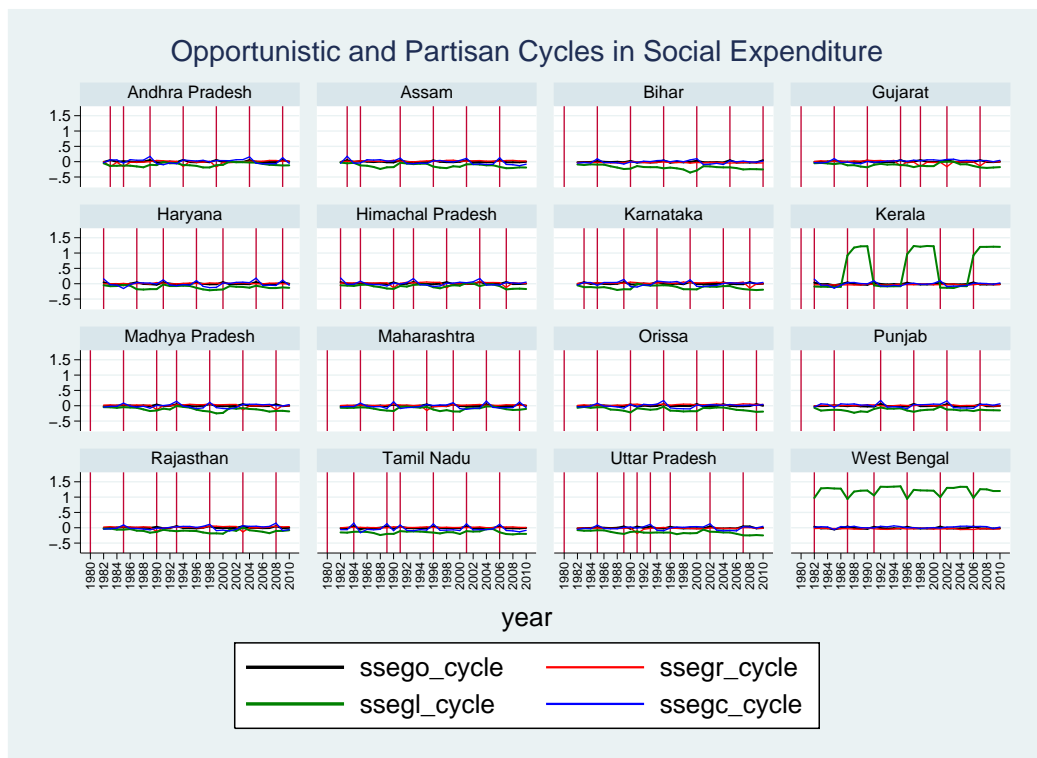
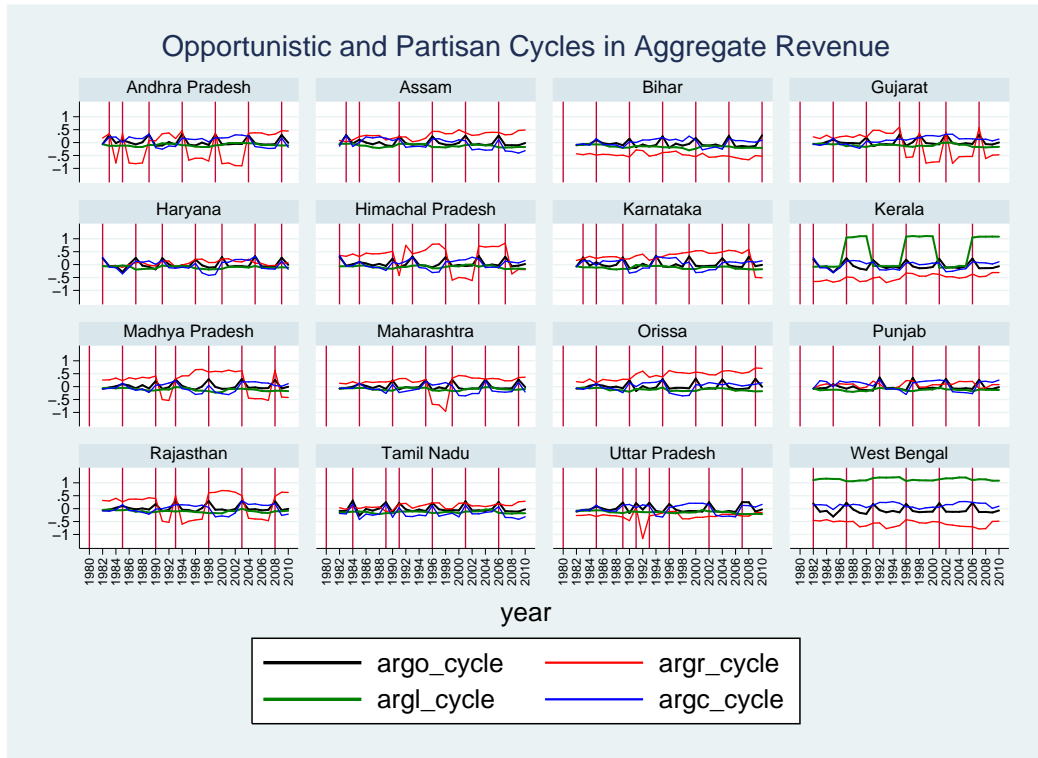


Figure B.14: Opportunistic and Partisan Cycles in Aggregate Revenue and Revenue Receipts (Assembly Elections)

(a) Aggregate Revenue



(b) Revenue Receipts

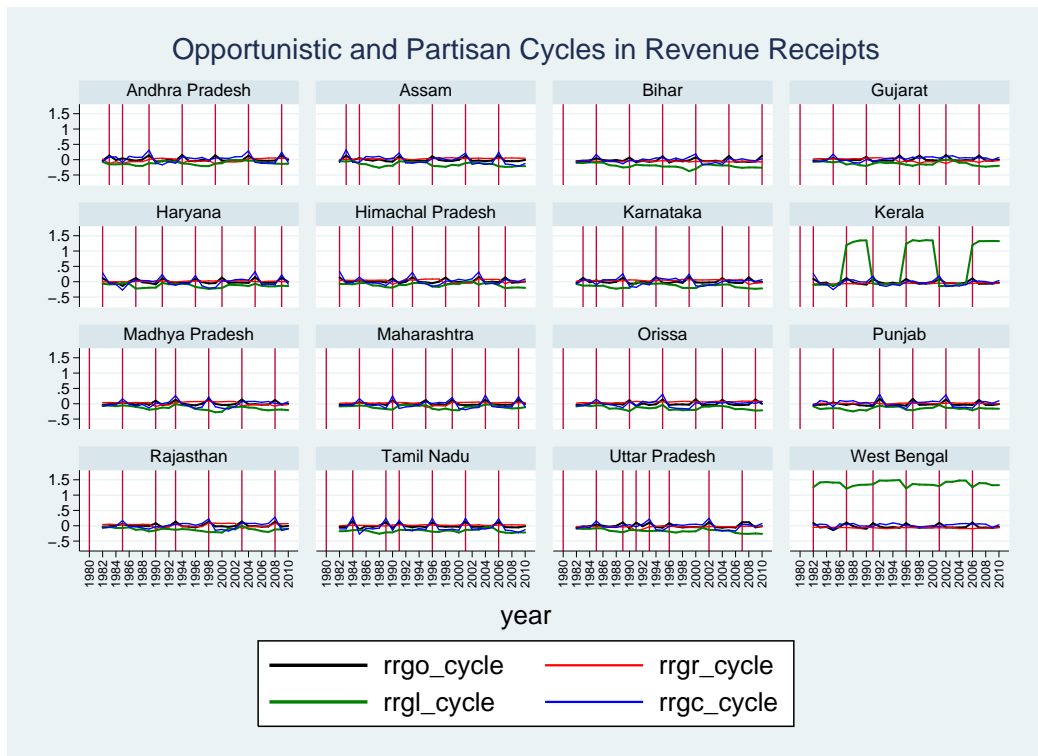
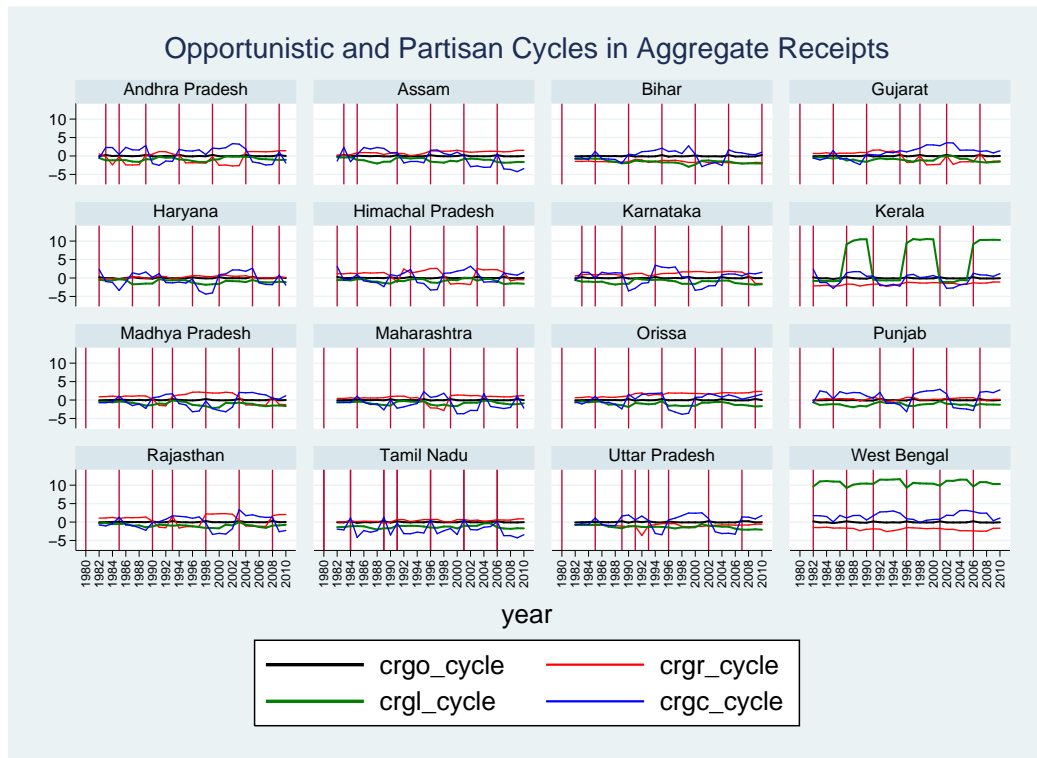


Figure B.15: Opportunistic and Partisan Cycles in Capital Receipts and Tax Revenue (Assembly Elections)

(a) Capital Receipts



(b) Tax Revenue

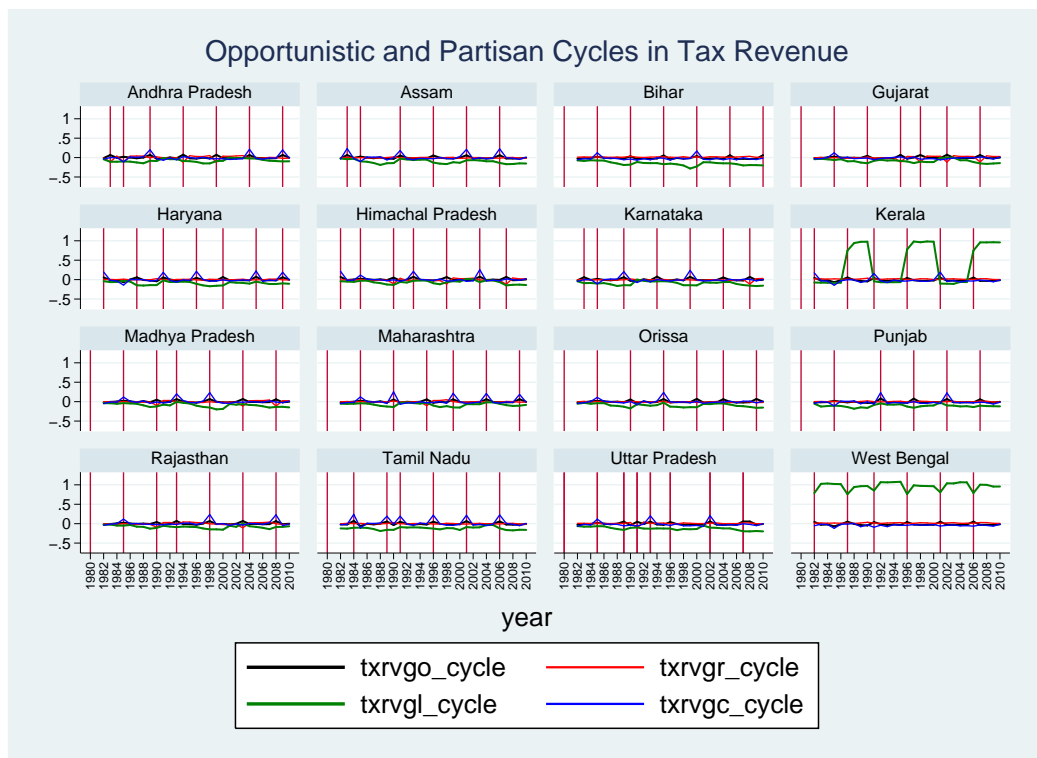
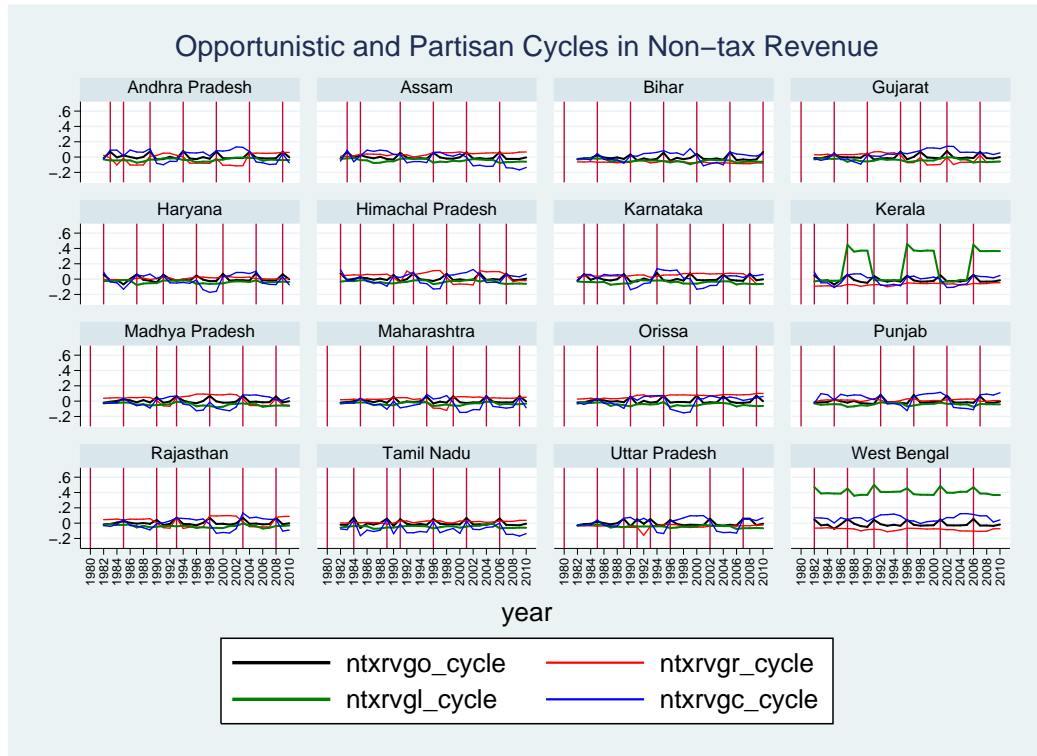
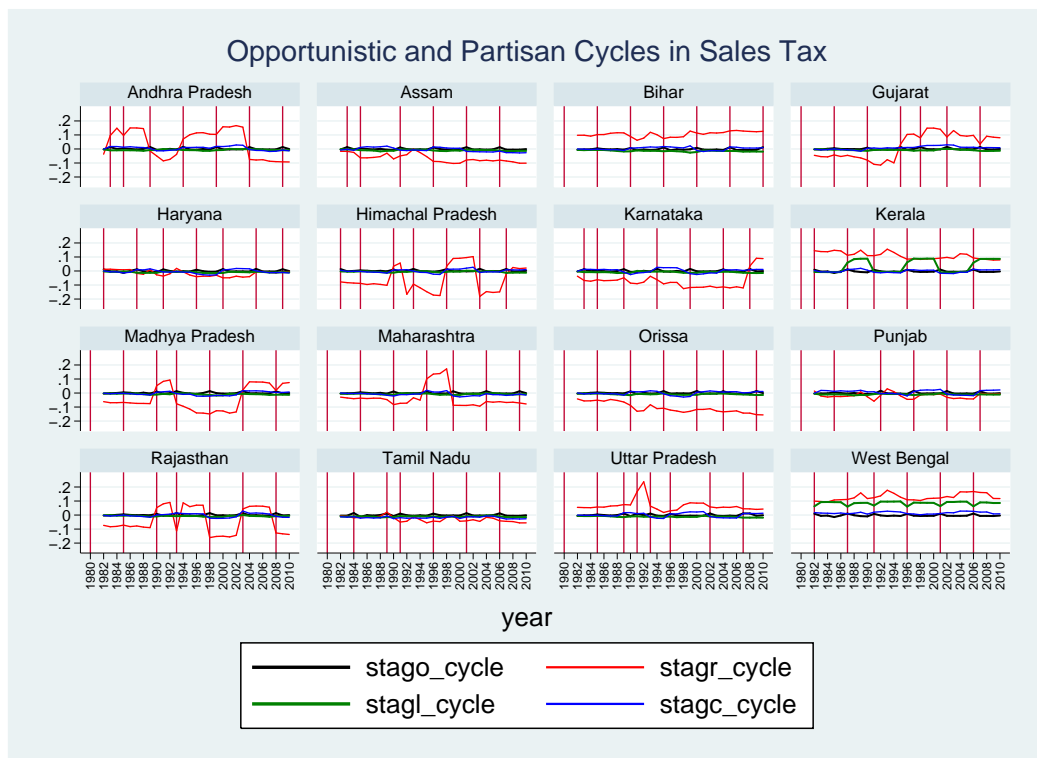


Figure B.16: Opportunistic and Partisan Cycles in Non-tax Revenue and Sales Tax (Assembly Elections)

(a) Non-tax Revenue



(b) Sales Tax



Appendix C

Results Pertaining to Center-state Political Transfer Cycle: Chapter 5

C.1 Data and Statistical Appendix

Figure B.2 of Chapter 4 depicts the aggregate revenue receipts of states. In this chapter we model the center-state political transfer cycles and the transfer variables in a federal structure of India are as follows: grants from the center (Gfc), loan from the center (Lfc) and tax devolution (Td). The Gfc and Td respectively contained in non-tax revenue and tax revenue under the state revenue receipts head. The Lfc contained in capital receipts. Figure 5.1 depicts the schematic flow chart of these transfers in detail. Following subsection explain about the data, definitions and sources.

C.1.1 Data Definition

The precise definition and the components of the transfers are as follows:

- *Grants from the Center (Gfc):* The grants provided to states are generally processed through the erstwhile Planning Commission (NITI Aayog). These transfers are for state and central plan schemes, centrally sponsored schemes, North Eastern Councils/Special plan schemes and non-plan grants (Statutory Grants, Grants for Natural Calamities, non plan non-statutory grants). The

basic principles for Grants are - determining the need of states from its budget, observing the efforts made by states to realize their potential revenue and equalizing standards of basic services across states. Grants could be given to take care of any special burden or obligations of national concern within the states' sphere, as well for providing any beneficial service of national interest to less advanced States. The earlier finance commissions have predominantly adopted a gap-filling approach to determine the quantum of grants to states to cover the deficit in the non-plan revenue account.

- *Loans from the Center (Lfc)*: *Lfc* is the part of state's capital receipts. In case of the loan from the center, state has the liability to pay it back.
- *Tax Devolution (Td)*: The tax devolution is formula based as decided consciously by the finance commission. It includes *shared income taxes*, *shared estate duty* and *share of union excise duties*.

The additional macroeconomic control variables considered in this chapter are: difference between the per capital national nominal GDP and the state level nominal SGDP (*Dpci*) and both the all India inflation (*Inf_i*) and state level inflation rates (*Inf_s*). The precise definition of the demographic and electoral variables such as political ideology (*pidum*), population density (*Density*), if the union and the state has the same ruling party or the state is an ally of the union (*Allied*), coalition government (*Cldum*) are already provided in Appendix B. The additional electoral variables we define here are as follows:

- *Voters' Turnout (Turn)*: The percentage of vote cast; out of the total eligible voters.
- *Years of Experience (Nypp)*: The year of the experience of political parties counted from the first year of forming the government.
- *Win Margin (Victory)*: It is the ratio of a difference between the seats won by the incumbent and opponent to the total number of seats in that state. If a ratio is positive, the incumbent regain its power and that refers as the victory.

Table C.1 present the data and their sources.

C.1.2 Variables and Sources

Table C.1: Variables and Sources

Variables	Period/Sources	Details
Grants from the Center (<i>Gfc</i>)	1980-81 to 2010-11. From Handbook of Statistics on State Government Finances-2010, Reserve Bank of India (RBI) (14.03.2013/2013a) and updated for 2010-11. ¹	The Gfc can be provided in case of - revenue deficit, disaster relief, to supplement the resources to the local bodies, sector specific and states specific etc.
Loans from the Center (<i>Lfc</i>)	1980-81 to 2010-11. From Handbook of Statistics on State Government Finances-2010, Reserve Bank of India (RBI) (14.03.2013/2013b) and updated for 2010-11. ²	Loans are also processed through the Planning commission and states are liable to pay back the loan. It can be plan loan or non plan loan from the center.
Tax Devolution (<i>Td</i>) or Share in Central Taxes	1980-81 to 2010-11. From Handbook of Statistics on State Government Finances-2010, Reserve Bank of India (RBI) (14.03.2013/2013g) and updated for 2010-11. ³	Devolution and other transfer of resources are done through the Finance Commission. It is also the shared taxes of the Union from the states.

The following section provides the graphical representation of the political transfer cycles of *Gfc*, *Lfc* and *Td* with respect to the parliamentary and the assembly elections. The x-axes represent the years, and vertical red bars within the figures represent the year of the election to capture the cyclical movement of transfers in the year of the elections. The data are in fiscal year as *1980-81* to *2010-11* however, for convenience

¹<https://www.rbi.org.in/Scripts/Publications.aspx?publication=Occasional>

²<https://www.rbi.org.in/Scripts/Publications.aspx?publication=Occasional>

³<https://www.rbi.org.in/Scripts/Publications.aspx?publication=Occasional>

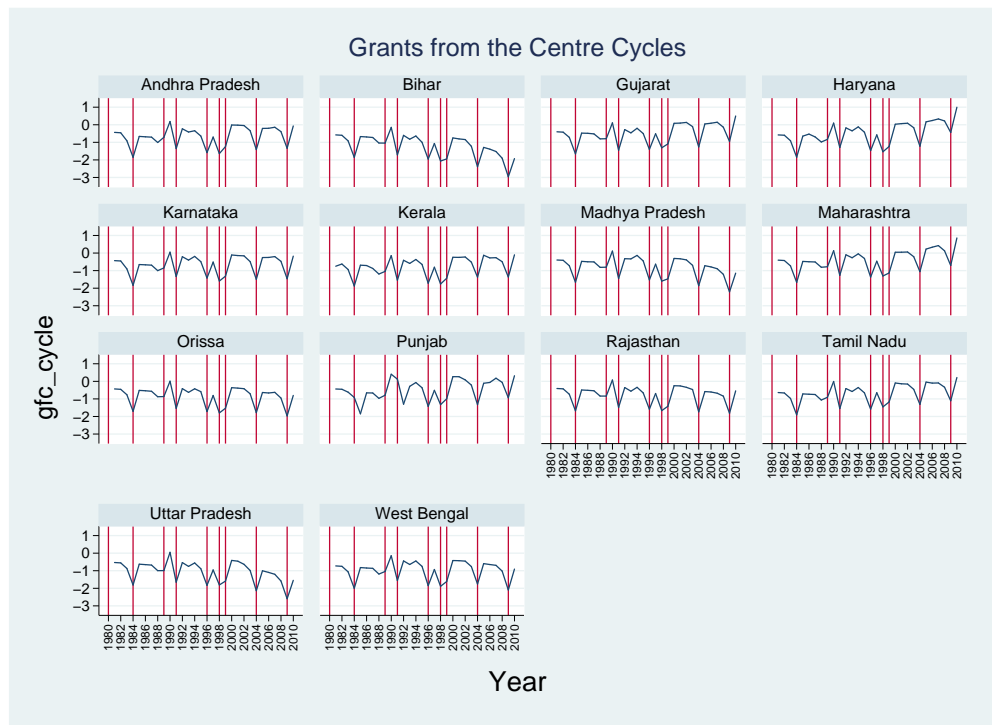
we represent the x-axes by the calendar years. The blue cyclical line in Figures C.1 to C.4 show the political transfer cycle.

C.2 Results

C.2.1 Political Transfer Cycles with Respect to Parliamentary Elections

Figures C.1 and C.2 (C.2a and C.2b) show the political transfer cycles respectively in Gfc , Lfc and Td with respect to parliamentary elections.

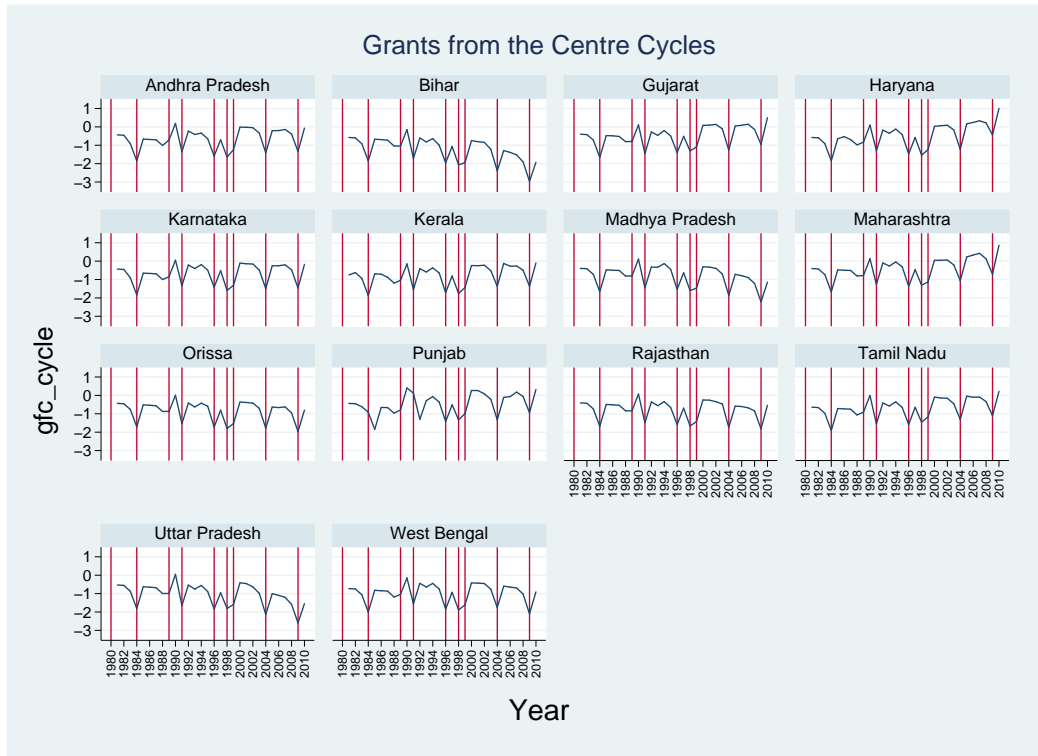
Figure C.1: Transfer Cycles in Grants from the Centre (Parliamentary Elections)



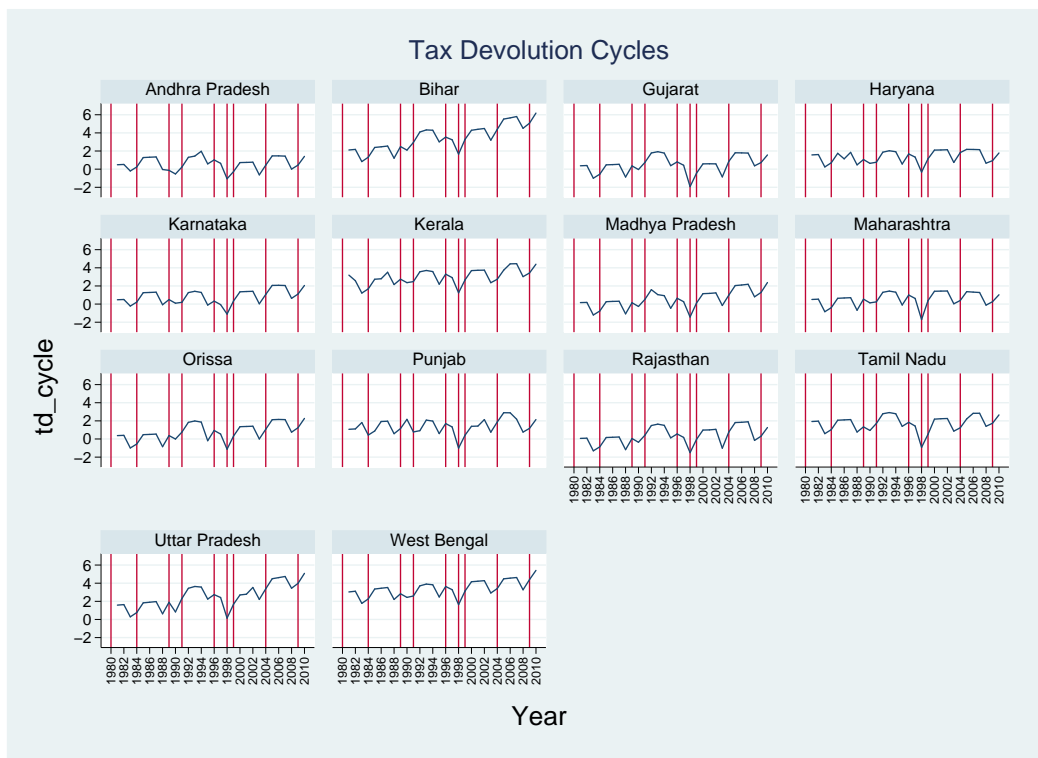
Source: Author's calculations

Figure C.2: Transfer Cycles in Loans from the Center and Tax Devolutions (Parliamentary Elections)

(a) Loans from the Center



(b) Tax Devolution

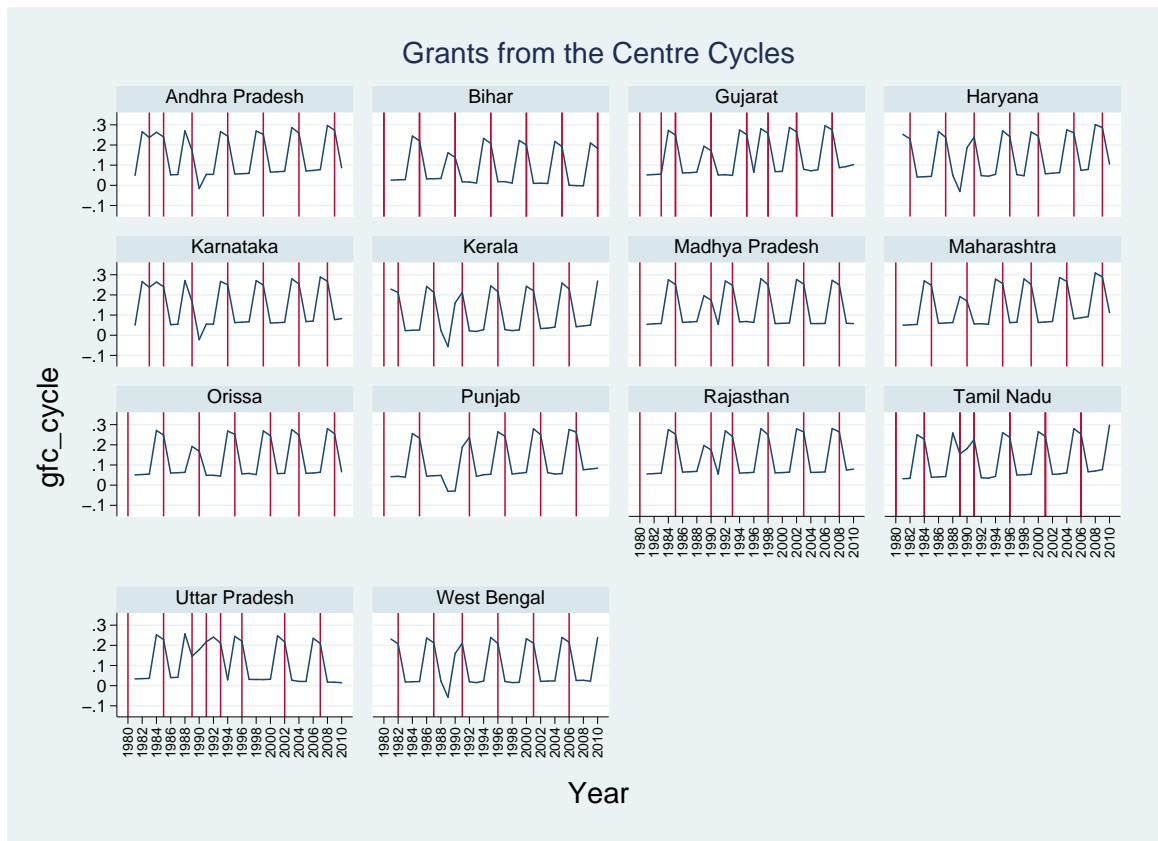


C.2.2 Political Transfer Cycles with Respect to Assembly Elections

Figures C.3 and C.4 (C.4a and C.4b) show the political transfer cycles respectively in Gfc , Lfc and Td with respect to assembly elections.

The next subsections provide the regression results of the Logit model. Tables C.2, C.3 and C.4 present the results of the Logit model of the probability of win of the incumbent in the parliamentary elections. Similarly, Tables C.5, C.6 and C.7 present the results of the probability of win of the incumbent in the assembly elections.

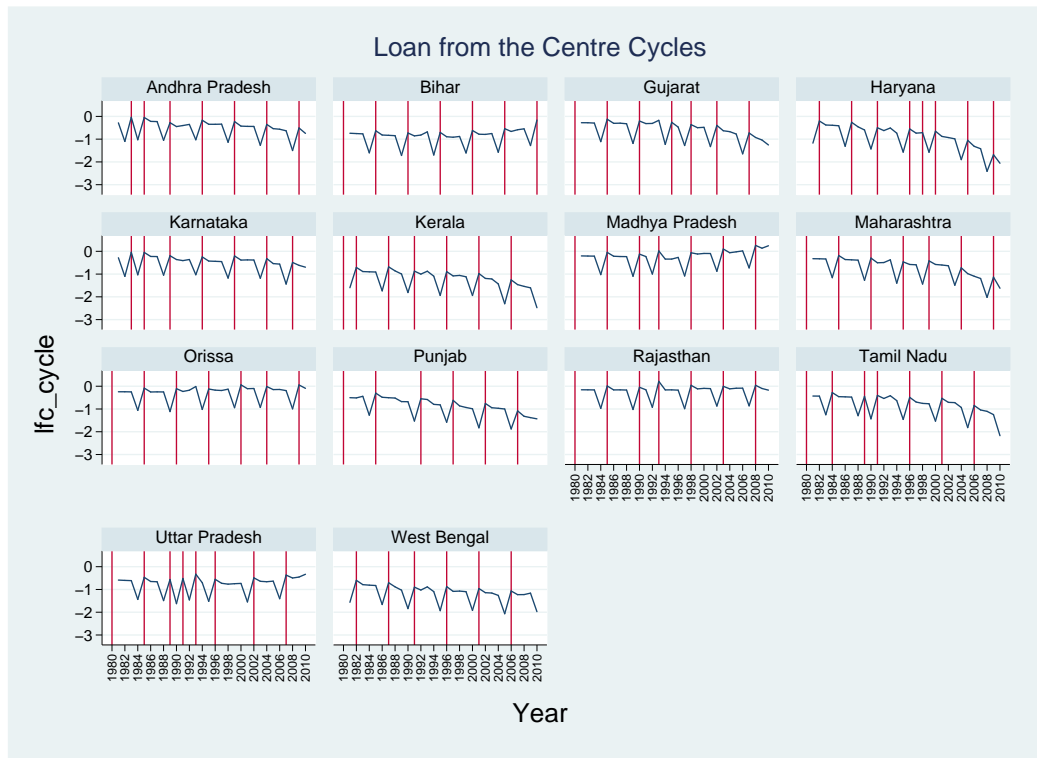
Figure C.3: Transfer Cycles in Grants from the Center (Assembly Elections)



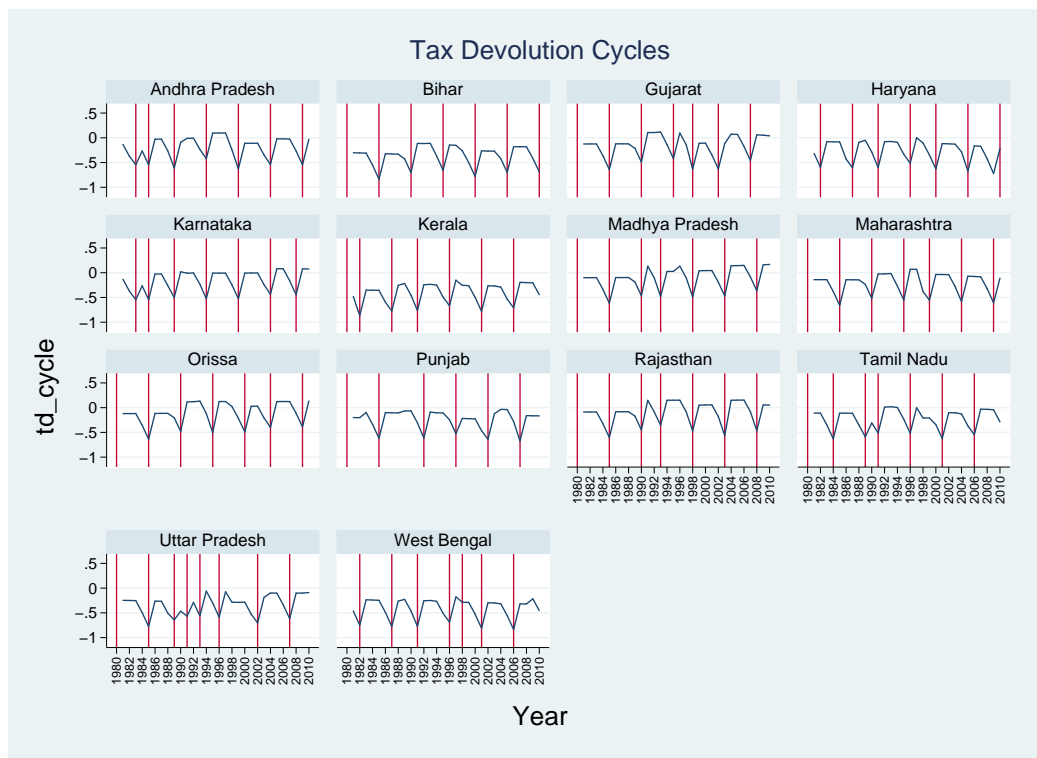
Source: Author's calculations

Figure C.4: Transfer Cycles in Loans from the Center and Tax Devolutions (Assembly Elections)

(a) Loan from the Center



(b) Tax Devolutions



C.2.3 Logit Model using Parliamentary Elections

Table C.2: Effect of Grants from the Center on Winning Possibility of the Incumbent

Dependent Var.- Victory	I		II		III		IV		V	
	Coeff.	Odd Ratio	Coeff.	Odd Ratio	Coeff.	Odd Ratio	Coeff.	Odd Ratio	Coeff.	Odd Ratio
<i>Gfc</i>	0.040 (0.046)	1.037 (0.016)	—	—	—	—	—	—	—	—
<i>Gfc (Yr_bf_Elect)</i>	—	—	-0.012 (0.024)	0.987 (-0.005)	—	—	—	—	—	—
<i>Gfc (Yr_Elect)</i>	—	—	—	—	-0.007 (0.025)	0.992 (-0.003)	—	—	—	—
<i>OM of Gfc (Yr_bf_Elect)</i>	—	—	—	—	—	—	0.198 (0.106)*	1.220 (0.087)	—	—
<i>OM of Gfc (Yr_Elect)</i>	—	—	—	—	—	—	—	—	0.086 (0.085)	1.090 (0.038)
<i>Inf_i</i>	-0.133 (0.044)***	0.875 (-0.058)	-0.126 (0.043)***	0.881 (-0.055)	-0.127 (0.043)***	0.880 (-0.056)	-0.125 (0.044)***	0.882 (-0.055)	-0.135 (0.044)***	0.873 (-0.059)
<i>Density</i>	-0.005 (0.002)*	0.994 (-0.002)	-0.005 (0.002)*	0.994 (-0.002)	-0.005 (0.002)*	0.994 (-0.002)	-0.005 (0.002)**	0.994 (-0.002)	-0.005 (0.002)*	0.994 (-0.002)
<i>Turnout</i>	0.158 (0.028)***	1.172 (0.071)	0.157 (0.028)***	1.170 (0.069)	0.157 (0.028)***	1.170 (0.069)	0.159 (0.028)***	1.173 (0.071)	0.159 (0.028)***	1.173 (0.071)
<i>Nypp</i>	0.011 (0.015)	1.011 (0.004)	0.009 (0.015)	1.009 (0.004)	0.010 (0.015)	1.010 (0.004)	0.014 (0.015)	1.014 (0.006)	0.008 (0.015)	1.008 (0.003)
<i>Pidum</i>	0.744 (0.629)	2.105 (0.329)	0.580 (0.618)	1.786 (0.256)	0.618 (0.611)	1.857 (0.274)	0.865 (0.628)	2.376 (0.383)	0.523 (0.618)	1.687 (0.231)
<i>Allied</i>	-1.416 (0.511)***	0.242 (-0.626)	-1.407 (0.506)***	0.244 (-0.622)	-1.399 (0.506)***	0.246 (-0.619)	-1.394 (0.507)***	0.247 (-0.616)	-1.383 (0.508)***	0.250 (-0.612)
<i>Cldum</i>	-1.602 (0.601)***	0.201 (-0.708)	-1.684 (0.596)***	0.185 (-0.745)	-1.640 (0.599)***	0.194 (-0.725)	-1.496 (0.605)**	0.224 (-0.662)	-1.552 (0.606)***	0.212 (-0.686)
<i>Cla_dum</i>	0.797 (0.623)	2.219 (0.352)	0.800 (0.621)	2.227 (0.354)	0.788 (0.620)	2.199 (0.348)	0.764 (0.622)	2.148 (0.338)	0.757 (0.622)	2.132 (0.334)
<i>Time Trend</i>	0.081 (0.037)**	1.084 (0.035)	0.087 (0.037)**	1.091 (0.038)	0.085 (0.037)**	1.089 (0.037)	0.078 (0.037)**	1.081 (0.034)	0.082 (0.037)**	1.086 (0.036)
<i>State Fixed Effects</i>	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
<i>LR $\chi^2(10)$</i>	110.03 (Pr.=0.00)	110.03 (Pr.=0.00)	109.68 (Pr.=0.00)	109.68 (Pr.=0.00)	109.50 (Pr.=0.00)	109.50 (Pr.=0.00)	113.16 (Pr.=0.00)	113.16 (Pr.=0.00)	110.45 (Pr.=0.00)	110.45 (Pr.=0.00)
<i>Pseudo R²</i>	0.2075	0.2075	0.2068	0.2068	0.2068	0.2068	0.2134	0.2134	0.2083	0.2083
<i>No. of Obs.</i>	434	434	434	434	434	434	434	434	434	434

Note 1: OM is Opportunistic Manipulations, Coefficients are from conditional fixed effect Logit regressions.

Note 2: Robust Standard errors are in parentheses in the coefficient column., ***, **, * Significant at 1%, 5% and 10% level respectively.

Note 3: Average (semi-) elasticities of Pr(Y=1/X,u) in parentheses in the odd ratio column

Table C.3: Effect of Loans from the Center on Winning Possibility of the Incumbent

<i>Lfc</i>	0.072 (0.032)**	1.075 (0.032)	—	—	—	—	—	—	—
<i>Lfc (Yr_bf_Elect)</i>	—	—	-0.019 (0.017)	0.981 (-0.008)	—	—	—	—	—
<i>Lfc (Yr_Elect)</i>	—	—	—	—	0.010 (0.021)	1.010 (0.004)	—	—	—
<i>OM of Lfc (Yr_bf_Elect)</i>	—	—	—	—	—	—	-0.085 (0.053)*	0.918 (-0.037)	—
<i>OM of Lfc (Yr_Elect)</i>	—	—	—	—	—	—	—	—	-0.098 (0.055)
<i>Inf_i</i>	-0.110 (0.044)***	0.895 (-0.048)	-0.130 (0.043)***	0.877 (-0.057)	-0.128 (0.043)***	0.879 (-0.056)	-0.135 (0.044)***	0.873 (-0.060)	-0.130 (0.043)***
<i>Density</i>	-0.004 (0.002)	0.996 (-0.002)	-0.005 (0.002)*	0.994 (-0.002)	-0.005 (0.002)*	0.994 (-0.002)	-0.005 (0.002)**	0.994 (-0.002)	-0.005 (0.002)*
<i>Turnout</i>	0.145 (0.028)***	1.156 (0.064)	0.159 (0.028)***	1.172 (0.071)	0.155 (0.028)***	1.168 (0.068)	0.160 (0.028)***	1.173 (0.071)	0.161 (0.028)***
<i>Nypp</i>	0.008 (0.015)	1.008 (0.003)	0.009 (0.015)	1.009 (0.004)	0.010 (0.015)	1.010 (0.004)	0.014 (0.015)	1.015 (0.006)	0.012 (0.015)
<i>Pidum</i>	0.549 (0.613)	1.731 (0.243)	0.614 (0.613)	1.848 (0.271)	0.624 (0.612)	1.866 (0.276)	0.823 (0.627)	2.277 (0.364)	0.705 (0.617)
<i>Allied</i>	-1.345 (0.521)***	0.260 (-0.595)	-1.449 (0.510)***	0.234 (-0.641)	-1.393 (0.506)***	0.248 (-0.616)	-1.468 (0.514)***	0.230 (-0.649)	-1.399 (0.506)***
<i>Cldum</i>	-1.996 (0.627)***	0.135 (-0.883)	-1.653 (0.594)***	0.191 (-0.731)	-1.709 (0.605)***	0.180 (-0.756)	-1.630 (0.598)***	0.195 (-0.721)	-1.666 (0.595)***
<i>Clal_dum</i>	0.766 (0.635)	2.152 (0.339)	0.832 (0.622)	2.299 (0.368)	0.791 (0.621)	2.205 (0.349)	0.876 (0.627)	2.401 (0.387)	0.794 (0.621)
<i>Time Trend</i>	0.129 (0.042)**	1.138 (0.057)	0.083 (0.037)**	1.086 (0.036)	0.088 (0.037)**	1.093 (0.039)	0.078 (0.037)**	1.081 (0.035)	0.085 (0.037)**
<i>State Fixed Effects</i>	<i>YES</i>	<i>YES</i>	<i>YES</i>	<i>YES</i>	<i>YES</i>	<i>YES</i>	<i>YES</i>	<i>YES</i>	<i>YES</i>
<i>LR $\chi^2(10)$</i>	114.70 (Pr.=0.00)	114.70 (Pr.=0.00)	110.54 (Pr.=0.00)	110.54 (Pr.=0.00)	109.64 (Pr.=0.00)	109.64 (Pr.=0.00)	111.99 (Pr.=0.00)	111.99 (Pr.=0.00)	113.04 (Pr.=0.00)
<i>Pseudo R²</i>	0.2163	0.2163	0.2084	0.2084	0.2067	0.2067	0.2112	0.2112	0.2131
<i>No. of Obs.</i>	434	434	434	434	434	434	434	434	434

Note 1: *OM* is Opportunistic Manipulations, Coefficients are from conditional fixed effect Logit regressions.

Note 2: Robust Standard errors are in parentheses in the coefficient column., ***, **, * Significant at 1%, 5% and 10% level respectively.

Note 3: Average (semi-) elasticities of $\Pr(Y=1/X,u)$ in parentheses in the odd ratio column

Table C.4: Effect of Tax Devolution on Winning Possibility of the Incumbent

<i>Td</i>	-0.062 (0.038)	0.939 (-0.027)	—	—	—	—	—	—	—	—
<i>Td (Yr_bf_Elect)</i>	—	—	-0.010 (0.014)	0.989 (-0.004)	—	—	—	—	—	—
<i>Td (Yr_Elect)</i>	—	—	—	—	-0.009 (0.014)	0.990 (-0.004)	—	—	—	—
<i>OM of Td (Yr_bf_Elect)</i>	—	—	—	—	—	—	0.224 (0.100)**	1.252 (0.099)	—	—
<i>OM of Td (Yr_Elect)</i>	—	—	—	—	—	—	—	—	-0.045 (0.082)	0.955 (-0.020)
<i>Inf_i</i>	-0.121 (0.043)***	0.885 (-0.053)	-0.127 (0.043)***	0.881 (-0.056)	-0.127 (0.044)***	0.879 (-0.056)	-0.107 (0.043)***	0.897 (-0.047)	-0.125 (0.043)***	0.881 (-0.055)
<i>Density</i>	-0.003 (0.003)	0.996 (-0.001)	-0.005 (0.002)*	0.994 (-0.002)	-0.005 (0.002)*	0.994 (-0.00)	-0.005 (0.002)**	0.994 (-0.002)	-0.005 (0.002)*	0.994 (-0.002)
<i>Turnout</i>	0.157 (0.028)***	1.170 (0.069)	0.157 (0.028)***	1.171 (0.069)	0.158 (0.028)***	1.171 (0.070)	0.1580 (0.028)***	1.171 (0.069)	0.158 (0.028)***	1.171 (0.069)
<i>Nypp</i>	0.011 (0.015)	1.011 (0.005)	0.009 (0.015)	1.009 (0.004)	0.009 (0.015)	1.010 (0.004)	0.003 (0.015)	1.003 (0.001)	0.010 (0.015)	1.010 (0.004)
<i>Pidum</i>	0.488 (0.620)	1.630 (0.216)	0.610 (0.612)	1.840 (0.269)	0.607 (0.611)	1.836 (0.268)	0.548 (0.616)	1.731 (0.242)	0.588 (0.614)	1.801 (0.260)
<i>Allied</i>	-1.592 (0.527)***	0.203 (-0.704)	-1.420 (0.508)***	0.241 (-0.628)	-1.410 (0.508)***	0.244 (-0.624)	-1.392 (0.506)***	0.248 (-0.616)	-1.397 (0.507)***	0.247 (-0.618)
<i>Cldum</i>	-1.800 (0.608)***	0.165 (-0.796)	-1.663 (0.594)***	0.189 (-0.736)	-1.613 (0.600)***	0.199 (-0.713)	-1.953 (0.614)***	0.142 (-0.863)	-1.642 (0.596)***	0.193 (-0.726)
<i>Clal_dum</i>	0.927 (0.633)	2.529 (0.410)	0.808 (0.621)	2.244 (0.357)	0.796 (0.621)	2.217 (0.352)	0.818 (0.623)	2.266 (0.361)	0.789 (0.621)	2.202 (0.349)
<i>Time Trend</i>	0.078 (0.037)**	1.081 (0.034)	0.085 (0.037)**	1.089 (0.037)	0.083 (0.037)**	1.087 (0.036)	0.101 (0.038)**	1.106 (0.044)	0.085 (0.037)**	1.089 (0.037)
<i>State Fixed Effects</i>	<i>YES</i>	<i>YES</i>	<i>YES</i>	<i>YES</i>	<i>YES</i>	<i>YES</i>	<i>YES</i>	<i>YES</i>	<i>YES</i>	<i>YES</i>
<i>LR $\chi^2(10)$</i>	112.03 (Pr.=0.00)	112.03 (Pr.=0.00)	109.99 (Pr.=0.00)	109.99 (Pr.=0.00)	109.90 (Pr.=0.00)	109.90 (Pr.=0.00)	114.98 (Pr.=0.00)	114.98 (Pr.=0.00)	109.72 (Pr.=0.00)	109.72 (Pr.=0.00)
<i>Pseudo R²</i>	0.2112	0.2112	0.2074	0.2074	0.2072	0.2072	0.2168	0.2168	0.2069	0.2069
<i>No. of Obs.</i>	434	434	434	434	434	434	434	434	434	434

Note 1: *OM* is Opportunistic Manipulations, Coefficients are from conditional fixed effect Logit regressions.

Note 2: Robust Standard errors are in parentheses in the coefficient column., ***, **, * Significant at 1%, 5% and 10% level respectively.

Note 3: Average (semi-) elasticities of $\Pr(Y=1/X,u)$ in parentheses in the odd ratio column

C.2.4 Logit Model using Assembly Elections

Table C.5: Effect of Grants from the Center on Winning Possibility of the Incumbent

Dependent Var.- Victory	I		II		III		IV		V	
	Coeff.	Odd Ratio	Coeff.	Odd Ratio	Coeff.	Odd Ratio	Coeff.	Odd Ratio	Coeff.	Odd Ratio
<i>Gfc</i>	-0.076 (0.072)	1.926 (-0.047)	-	-	-	-	-	-	-	-
<i>Gfc (Yr_bf_Elect)</i>	-	-	-0.004 (0.030)	0.996 (-0.002)	-	-	-	-	-	-
<i>Gfc (Yr_Elect)</i>	-	-	-	-	-0.013 (0.031)	0.986 (-0.008)	-	-	-	-
<i>OM of Gfc (Yr_bf_Elect)</i>	-	-	-	-	-	-	-0.287 (0.140)**	0.750 (-0.177)	-	-
<i>OM of Gfc (Yr_Elect)</i>	-	-	-	-	-	-	-	-	0.060 (0.132)	1.063 (0.037)
<i>Inf_s</i>	-0.015 (0.035)	0.984 (-0.009)	-0.015 (0.035)	0.984 (-0.009)	-0.014 (0.035)	0.986 (-0.008)	-0.019 (0.035)	0.980 (-0.012)	-0.013 (0.035)	0.986 (-0.008)
<i>Density</i>	0.012 (0.004)***	1.012 (0.007)	0.012 (0.004)***	1.012 (0.007)	0.011 (0.004)***	1.012 (0.007)	0.012 (0.004)***	1.012 (0.007)	0.011 (0.004)***	1.012 (0.007)
<i>Turnout</i>	0.155 (0.033)***	1.1682 (0.095)	0.159 (0.033)***	1.173 (0.098)	.159 (0.033)***	1.173 (0.098)	0.137 (0.034)***	1.189 (0.107)	0.159 (0.033)***	1.173 (0.098)
<i>Nypp</i>	0.014 (0.016)	1.014 (0.009)	0.012 (0.016)	1.012 (0.007)	0.012 (0.016)	1.012 (0.007)	0.013 (0.016)	1.013 (0.008)	0.011 (0.016)	1.011 (0.007)
<i>Pidum</i>	-0.741 (0.266)***	0.476 (-0.457)	-0.652 (0.254)	0.520 (-0.404)	-0.661 (0.253)***	0.516 (-0.408)	-0.694 (0.257)***	0.499 (-0.429)	-0.638 (0.254)***	0.528 (-0.394)
<i>Allied</i>	0.900 (0.896)	2.459 (0.555)	0.814 (0.897)	2.257 (0.504)	0.791 (0.897)	2.205 (0.488)	0.861 (0.910)	2.365 (0.533)	0.844 (0.900)	2.325 (0.521)
<i>Cldum</i>	-0.328 (0.388)	0.720 (-0.203)	-0.328 (0.390)	0.720 (-0.203)	-0.335 (0.390)	0.715 (-0.207)	-0.359 (0.392)	0.698 (-0.222)	-0.328 (0.390)	0.720 (-0.203)
<i>Cla_dum</i>	-0.891 (1.012)	0.409 (-0.550)	-0.830 (1.014)	0.435 (-0.514)	-0.801 (1.015)	0.448 (-0.490)	-0.820 (1.031)	0.440 (-0.507)	-0.856 (1.017)	0.424 (-0.528)
<i>Time Fixed Effects</i>	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
<i>State Fixed Effects</i>	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
<i>LR $\chi^2(10)$</i>	141.04 (Pr.=0.00)	141.04 (Pr.=0.00)	139.78 (Pr.=0.00)	139.78 (Pr.=0.00)	140.08 (Pr.=0.00)	140.08 (Pr.=0.00)	144.06 (Pr.=0.00)	144.06 (Pr.=0.00)	140.11 (Pr.=0.00)	140.11 (Pr.=0.00)
<i>Pseudo R²</i>	0.3361	0.3361	0.3333	0.3333	0.3339	0.3339	0.3435	0.3435	0.3339	0.3339
<i>No. of Obs.</i>	403	403	402	402	403	403	403	403	403	403

Note 1: *OM* is Opportunistic Manipulations, Coefficients are from conditional fixed effect Logit regressions.

Note 2: Robust Standard errors are in parentheses in the coefficient column., ***, **, * Significant at 1%, 5% and 10% level respectively.

Note 3: Average (semi-) elasticities of $\Pr(Y=1/X,u)$ in parentheses in the odd ratio column

Table C.6: Effect of Loans from the Center on Winning Possibility of the Incumbent

Dependent Var.- Victory	I		II		III		IV		V	
	Coeff.	Odd Ratio	Coeff.	Odd Ratio	Coeff.	Odd Ratio	Coeff.	Odd Ratio	Coeff.	Odd Ratio
<i>Lfc</i>	0.118 (0.049)**	1.125 (0.073)	—	—	—	—	—	—	—	—
<i>Lfc (Yr_bf_Elect)</i>	—	—	0.017 (0.032)	1.018 (0.011)	—	—	—	—	—	—
<i>Lfc (Yr_Elect)</i>	—	—	—	—	-0.044 (0.034)	0.956 (-0.027)	—	—	—	—
<i>OM of Lfc (Yr_bf_Elect)</i>	—	—	—	—	—	—	-0.277 (0.114)**	0.757 (-0.171)	—	—
<i>OM of Lfc (Yr_Elect)</i>	—	—	—	—	—	—	—	—	0.159 (0.116)	1.172 (0.098)
<i>Inf-s</i>	-0.015 (0.036)	0.985 (-0.009)	-0.014 (0.035)	0.986 (-0.008)	-0.011 (0.035)	0.989 (-0.006)	-0.018 (0.035)	0.982 (-0.011)	-0.020 (0.035)	0.979 (-0.012)
<i>Density</i>	0.013 (0.004)***	1.125 (0.008)	0.012 (0.004)***	1.012 (0.007)	0.011 (0.004)***	1.012 (0.007)	0.012 (0.004)***	1.012 (0.007)	0.011 (0.004)***	1.012 (0.007)
<i>Turnouts</i>	0.163 (0.033)***	1.177 (0.100)	0.161 (0.033)***	1.175 (0.099)	0.163 (0.033)***	1.177 (0.100)	0.164 (0.033)***	1.178 (0.101)	0.159 (0.033)***	1.172 (0.098)
<i>Nypp</i>	0.013 (0.016)	1.013 (0.008)	0.011 (0.016)	1.011 (0.007)	0.011 (0.016)	1.011 (0.007)	0.011 (0.016)	1.011 (0.007)	0.012 (0.016)	1.012 (0.007)
<i>Pidum</i>	-0.623 (0.246)***	0.536 (-0.385)	-0.641 (0.251)	0.526 (-0.396)	-0.680 (0.253)***	0.506 (-0.420)	-0.697 (0.261)***	0.497 (-0.432)	-0.636 (0.252)***	0.529 (-0.393)
<i>Allied</i>	0.974 (0.923)	2.648 (0.601)	0.860 (0.893)	2.365 (0.533)	0.658 (0.894)	1.932 (0.407)	0.896 (0.912)	2.449 (0.554)	0.872 (0.915)	2.393 (0.538)
<i>Cldum</i>	-0.300 (0.395)	0.740 (-0.185)	-0.335 (0.391)	0.715 (-0.207)	-0.339 (0.392)	0.712 (-0.209)	-0.278 (0.397)	0.757 (-0.172)	-0.292 (0.391)	0.746 (-0.180)
<i>Clal_dum</i>	-0.963 (1.038)	0.382 (-0.594)	-0.872 (1.011)	0.418 (-0.539)	-0.655 (1.015)	0.518 (-0.405)	-0.877 (1.025)	0.416 (-0.543)	-0.972 (1.035)	0.378 (-0.600)
<i>Time Fixed Effects</i>	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
<i>State Fixed Effects</i>	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
<i>LR $\chi^2(10)$</i>	140.07 (Pr.=0.00)	140.07 (Pr.=0.00)	141.65 (Pr.=0.00)	141.65 (Pr.=0.00)	146.02 (Pr.=0.00)	146.02 (Pr.=0.00)	142.00 (Pr.=0.00)	142.00 (Pr.=0.00)	142.00 (Pr.=0.00)	142.00 (Pr.=0.00)
<i>Pseudo R²</i>	0.3479	0.3479	0.3339	0.3339	0.3376	0.3376	0.3481	0.3481	0.3384	0.3384
<i>No. of Obs.</i>	403	403	402	402	403	403	403	403	403	403

Note 1: *OM* is Opportunistic Manipulations, Coefficients are from conditional fixed effect Logit regressions.

Note 2: Robust Standard errors are in parentheses in the coefficient column., ***, **, * Significant at 1%, 5% and 10% level respectively.

Note 3: Average (semi-) elasticities of $\Pr(Y=1/X,u)$ in parentheses in the odd ratio column

Table C.7: Effect of Tax Devolution on Winning Possibility of the Incumbent

Dependent Var.- Victory	I		II		III		IV		V	
	Coeff.	Odd Ratio	Coeff.	Odd Ratio	Coeff.	Odd Ratio	Coeff.	Odd Ratio	Coeff.	Odd Ratio
<i>Td</i>	0.134 (0.057)**	1.143 (0.082)	—	—	—	—	—	—	—	—
<i>Td (Yr_bf_Elect)</i>	—	—	0.006 (0.017)	1.006 (0.000)	—	—	—	—	—	—
<i>Td (Yr_Elect)</i>	—	—	—	—	-0.005 (0.018)	0.994 (-0.003)	—	—	—	—
<i>OM of Td (Yr_bf_Elect)</i>	—	—	—	—	—	—	0.083 (0.095)**	1.086 (0.051)	—	—
<i>OM of Td (Yr_Elect)</i>	—	—	—	—	—	—	—	—	0.199 (0.131)	1.220 (0.122)
<i>Inf_s</i>	-0.017 (0.034)	0.983 (-0.010)	-0.014 (0.035)	0.986 (-0.008)	-0.014 (0.035)	0.985 (-0.008)	-0.015 (0.035)	0.984 (-0.009)	-0.021 (0.034)	0.979 (-0.013)
<i>Density</i>	0.006 (0.004)	1.006 (0.004)	0.012 (0.004)***	1.012 (0.007)	0.012 (0.004)***	1.012 (0.007)	0.012 (0.004)***	1.012 (0.007)	0.011 (0.004)***	1.011 (0.006)
<i>Turnout</i>	0.155 (0.033)***	1.168 (0.096)	0.159 (0.033)***	1.173 (0.098)	0.159 (0.033)***	1.173 (0.098)	0.159 (0.032)***	1.172 (0.098)	0.164 (0.033)***	1.178 (0.101)
<i>Nypp</i>	0.015 (0.016)	1.015 (0.009)	0.012 (0.016)	1.012 (0.007)	0.012 (0.016)	1.012 (0.007)	0.013 (0.016)	1.012 (0.007)	0.011 (0.016)	1.011 (0.007)
<i>Pidum</i>	-0.683 (0.258)***	0.504 (-0.422)	-0.644 (0.252)**	0.524 (-0.399)	-0.653 (0.253)***	0.520 (-0.403)	-0.671 (0.254)***	0.511 (-0.415)	-0.675 (0.252)***	0.508 (-0.417)
<i>Allied</i>	1.092 (0.892)	2.983 (0.675)	0.845 (0.897)	2.328 (0.523)	0.805 (0.897)	2.238 (0.497)	0.822 (0.896)	2.275 (0.508)	0.720 (0.892)	2.055 (0.444)
<i>Cldum</i>	-0.276 (0.397)	0.758 (-0.171)	-0.332 (0.390)	0.717 (-0.205)	-0.334 (0.391)	0.716 (-0.206)	-0.341 (0.391)	0.711 (-0.211)	-0.367 (0.392)	0.692 (-0.227)
<i>Clal_dum</i>	-1.032 (1.009)	0.356 (-0.637)	-0.857 (1.014)	0.424 (-0.530)	-0.821 (1.014)	0.439 (-0.507)	-0.847 (1.016)	0.428 (-0.524)	-0.698 (1.012)	0.497 (-0.431)
<i>Time Fixed Effects</i>	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
<i>State Fixed Effects</i>	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
<i>LR $\chi^2(10)$</i>	145.67 (Pr.=0.00)	145.67 (Pr.=0.00)	139.88 (Pr.=0.00)	139.88 (Pr.=0.00)	140.00 (Pr.=0.00)	140.00 (Pr.=0.00)	140.51 (Pr.=0.00)	140.51 (Pr.=0.00)	142.23 (Pr.=0.00)	142.23 (Pr.=0.00)
<i>Pseudo R²</i>	0.3472	0.3472	0.3335	0.3335	0.3337	0.3337	0.3350	0.3350	0.3390	0.3390
<i>No. of Obs.</i>	403	403	402	402	403	403	403	403	403	403

Note 1: *OM* is Opportunistic Manipulations, Coefficients are from conditional fixed effect Logit regressions.

Note 2: Robust Standard errors are in parentheses in the coefficient column., ***, **, * Significant at 1%, 5% and 10% level respectively.

Note 3: Average (semi-) elasticities of $\Pr(Y=1/X,u)$ in parentheses in the odd ratio column

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