THE ROLE OF POLITICS AND INSTABILITY ON PUBLIC SPENDING DYNAMICS AND MACROECONOMIC PERFORMANCE: THEORY AND EVIDENCE FROM TURKEY

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ABSTRACT

THE ROLE OF POLITICS AND INSTABILITY ON PUBLIC SPENDING DYNAMICS AND MACROECONOMIC PERFORMANCE: THEORY AND EVIDENCE FROM TURKEY

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This Ph.D. thesis comprises of two parts. Part I develops a framework to provide insights into the understanding of several political macro-economy issues related to fiscal policy making. This framework links the overall macroeconomic performance to the public spending and borrowing decisions. The key feature of this framework is that it makes a distinction between productive (e.g. public investment) and non-productive public spending (e.g. popular spending). It is shown that a high level of political instability may lead to myopic and populist policies and may be associated with less favorable macroeconomic performance in terms of not only future output and inflation but also future popular spending. Part I also suggests an alternative channel for expansionary or Non-Keynesian fiscal contractions based on the productivity enhancing role of productive public spending. It is shown that if the incumbent government reduces popular (productive) spending rather than productive (popular) spending, then Non-Keynesian (Keynesian) effects are achieved. Furthermore, it is shown that the favorable effects of public investment depends positively on its quality in this framework. Moreover, the net effect of productive spending financed by borrowing on the next period's macroeconomic performance depends on the benefits of productive spending relative to the costs of borrowing. Even under a capital borrowing rule higher public investment may yield unfavorable effects and also it may not necessarily prevent the strategic use of public investment, even though it prevents strategic debt accumulation. Part II investigates the effects of macroeconomic instability on capital accumulation and economic growth in the Turkish economy over the 1963-1999 period. Descriptive and econometric (time series) analyses suggest that macroeconomic instability not only deters capital accumulation and economic growth but it may also reverse the complementarity between public and private investment in the long-run.

Keywords: Composition of Public spending; Political Instability; Macroeconomic Performance; Strategic Debt Accumulation; Capital Borrowing Rule; Public Investment; Private Investment; Complementarity; Macroeconomic Instability. ÖZ

SİYASET VE İSTİKRARSIZLIĞIN KAMU HARCAMA DİNAMİKLERİ VE MAKROEKONOMİK PERFORMANS ÜZERİNDEKİ ROLÜ: TEORİ VE TÜRKİYE DENEYIMİ

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Bu doktora tezi iki kısımdan oluşmaktadır. Birinci kısım maliye politikalarının oluşturulması ile ilgili bazı politik makro-iktisat konularının daha iyi anlaşılması için teorik bir çerçeve oluşturmaktadır. Bu kurguda makroekonomik performans ile kamu harcama ve borçlanma kararları ilişkilendirilmektedir. Bu kurgunun temel özelliği verimli (örneğin kamu yatırımları) ve verimsiz kamu harcamaları (örneğin popüler harcamalar) arasında bir ayırımın yapılmasıdır. Yüksek düzeyde siyasi istikrarsızlığın kısa görüşlü ve popülist politikalara ve dolayısıyla daha kötü bir makroekonomik performansa yol açabileceği, ve bunun sadece gelecekteki üretim ve enflasyon açısından değil aynı zamanda gelecekteki popüler harcamaları

açısından da kötü olabileceği gösterilmiştir. Ayrıca, birinci kısımda, verimli kamu harcamalarının verimliliği artırıcı rolü dikkate alınarak, genişletici veya Keynesyen olmayan mali daralmalar için alternatif bir kanal önerilmektedir. Hükümetin popüler (verimli) harcamalar yerine verimli (popüler) harcamaları azaltması halinde Keynesyen (Keynesyen olmayan), yani daraltıcı (genişletici) bir etkinin gerçekleştiği gösterilmiştir. Buna ilaveten, bu çerçevede kamu yatırımlarının kalitesinin de kamu yatırımlarının olumlu etkilerini pozitif yönde etkilediği gösterilmiştir. Bunların yanı sıra, borçlanma ile finanse edilen verimli harcamaların gelecek dönemdeki makroekonomik performans üzerindeki net etkileri bu harcamaların olumlu etkilerinin yanı sıra borçlanmanın maliyetinede bağlıdır. Sermaye borçlanma kuralının uygulanması, başka bir deyişle yatırım için borçlanma durumunda dahi kamu yatırımlarındaki bir artışın makroekonomik performans üzerinde olumsuz etkileri olabilir ve bu kuralın uygulanması her ne kadar stratejik amaçlı borçlanmayı engellese de, kamu yatırımlarının stratejik amaçlı kullanımını engellemeyebilir. İkinci kısım Türkiye ekonomisindeki makroekonomik istikrarsızlığın sermaye birikimi ve ekonomik büyüme üzerindeki etkilerini 1963-1999 yılları için araştırmaktadır. Tasviri ve ekonometrik (zaman serisi) analizler makroekonomik istikrarsızlığın sermaye birikimini ve ekonomik büyümeyi kötü etkilemekle kalmayıp ayrıca uzun vadede kamu yatırımları ve özel yatırımlar arasındaki tamamlayıcılık ilişkisini tersine çevirmiş olabileceğini göstermiştir.

Anahtar kelimeler: Kamu Harcamalarının Bileşimi; Politik İstikrarsızlık; Makroekonomik Performans; Stratejik Borç Birikimi; Sermaye Borçlanma Kuralı; Kamu Yatırımları; Özel Yatırımlar; Tamamlayıcılık; Makroekonomik İstikrarsızlık. To my parents and my wife

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CHAPTER 1

INTRODUCTION AND OVERVIEW

The policy makers in Turkey and in many other developing countries, such as those in Latin America, behaved "fiscally irresponsible" by implementing myopic and populist macroeconomic policies over extended periods of time. These countries, in turn, persistently exhibited high budget deficits, excessive debt accumulation, high and volatile inflation rates. Hence, chronic macroeconomic instability has become a central feature of their economies. Additionally, during their macroeconomic instability episodes, most of these countries have registered remarkable declines as well as volatility in their rates of capital formation. In retrospect, continuously low and volatile economic growth rates and recurrent crises have become an endemic feature of these economies.

Several authors argue that unsound policies, such as myopic and populist policies, and associated macroeconomic instability of developing countries usually emanate from deeper socio-political instabilities (e.g. due to income distribution) but not from technical "mistakes" or misjudgments of policy makers.¹ Dornbusch and Edwards (1991), for instance, provide evidence on the link

¹See, for example, introduction part and a number of papers collected in Sachs (1989).

between macroeconomic $populism^2$ and income inequality as well as on detrimental consequences of populist policies on macroeconomic stability, based on Latin American experience. The main results of this study is nicely summarized in Dornbusch and Edwards (1995):³

although populist episodes have had specific and unique characteristics in different nations, they tend to have some fundamental common threads. In particular, populist regimes have historically tried to deal with income inequality problems through the use of overly expansive macroeconomic policies. These policies, which have relied on deficit financing, generalized controls, and a disregard for basic economic principles, have almost unavoidably resulted in major macroeconomic crises that ended up hurting poorest segments of society. At the end of every populist experiment, inflation is out of hand, macroeconomic disequilibria are ramphant, and real wages are lower than they were at the beginning of these experiences (Dornbusch and Edwards, 1995: 5).

Likewise, many other economists nowadays emphasize both the importance and the role of the socio-political environment on numerous economic policies, such as public spending and borrowing policies, and resultant outcomes.⁴ Therefore, one of the main objectives of this thesis is to develop political macroeconomy models to analyze the role of a set of politico-economic (as well as institutional) factors on public spending and borrowing decisions and macroeconomic performance, by focusing on the productivity-enhancing role of public investment. The second objective is to investigate the effects of

²Macroeconomic populism is described as "an approach based on the use of overly expansive macroeconomic policies to achieve distributive goals" (Dornbusch and Edwards, 1995: 2).

 $^{^{3}}$ Onis (2002: 2) has also made similar arguments based on the Turkish experience. See Section 7.1 for an overview of his arguments.

 $^{{}^{4}}$ See, for example, Persson and Tabellini (2000), Romer (2001) and Drazen (2000) for an overview and empirical evidence.

macroeconomic instability on public and private investment as well as on the nature of their relationships (e.g. complementarity) and economic growth in the Turkish economy over the 1963-1999 period.

Thus, this thesis has two main objectives and, consequently, comprises of two parts. Part I, which is the theoretically-based part, focuses on issues such as the role of political instability on public spending and borrowing decisions and macroeconomic performance; composition of fiscal adjustments; capital borrowing rule; and the role of corruption on quality of public investment and macroeconomic performance. Part II, which is the empirically-based part, focuses on the impacts of macroeconomic instability on both public and private capital formation and economic growth by considering the Turkish experience over the 1963-1999 period.

Therefore, consistent with the aforementioned structure of the thesis, Section 1.1 of this introductory chapter presents the main issues (in Section 1.1.1) and then provides a condensed overview of the chapters contained in Part I (in Section 1.1.2). Similarly, Section 1.2 presents an introduction to Part II (in Section 1.2.1) and then provides an overview of the chapters in that part (in Section 1.2.2).

1.1 Part I: Politics, Public Spending, Borrowing and Macroeconomic Performance

1.1.1 Introduction to Part I

Part I concentrates on several politico-economic issues. The first issue, which is the main focus of Part I, is the role of socio-political instability on macroeconomic policy making and performance. More specifically, the first part of the thesis attempts to provide some political economy explanations to myopic and populist policies and resultant undesirable macroeconomic outcomes, by explicitly incorporating public spending decisions as well as public borrowing decisions into a macroeconomic policy making framework.

It is widely argued that socio-political instability have serious implications for public borrowing and spending decisions. One of the sources of sociopolitical instability is income inequality. The high degree of income and wealth inequality increases the demand for redistributive public spending (see, for example, Alesina and Rodrik, 1994; and Benabou, 1996). Other sources of sociopolitical instability, such as high degree of social and ethnic fractionalization, also have serious implications on public spending decisions of the incumbent governments (see, for example, Annett, 2001). One clear implication of the results of the related studies⁵ is that governments in more fractionalized societies tend to favor public consumption at the expense of public investment. Thus, political instability plays a major role on both the level and the composition of public spending.

Similarly, it is frequently argued that political instability (via electoral uncertainty) may lead to strategic political behavior and myopic policies in the forms of low level of public investment, and excessive debt accumulation or "inefficient budget deficits"⁶ (see, for instance, Persson and Tabellini, 2000).⁷ Political instability may also lead to myopic policies in different forms. For example, Cukierman *et al.* (1992) argue that the incumbent government delays tax reform and relies more on seigniorage if she faces a low probability of reelection and opposition.

The central feature of the models developed in Part I is that two types of public spending: productive vs. non-productive spending⁸ are incorporated

⁵See Chapter 2 for more detail and empirical evidence.

 $^{^{6}}$ Inefficient deficits refers to the deficits which are inefficiently large, for example, due to the role of political forces on the policy making process. See Romer (2001: 547-551) for more detail.

⁷See Chapter 2 for more detail and empirical evidence.

⁸Productive (or productivity enhancing) public spending includes, for example, public

into a simple model of discretionary monetary and fiscal policy.⁹ In other words, policy makers' choice for one type of public spending over the other, given the constraints of policy making on the decisions (e.g. budget constraint) is taken to be determined by a set of political economy factors. For instance, this macroeconomic framework allows us to analyze the effects of political instability on macroeconomic outcomes, such as inflation, public spending and output, by linking the overall macroeconomic performance to the decisions on the composition of public spending. Additionally, this framework also allows us to analyze both the centralized and the decentralized structure. That is, while the government is the only authority actively designing both the monetary and fiscal policies in the former structure, monetary policy making is in the hands of an independent central bank in the latter. This flexibility with respect to the institutional structure of macroeconomic policy making is important given the concerted efforts by many industrial and developing countries delegating monetary policy making powers to independent central banks during the last fifteen years.

Furthermore, the key to the macroeconomic framework of this study is the productivity enhancing role of public investment, which has drawn the attention of the economists since the pioneering work of Aschauer (1989a,b).¹⁰ Aschauer argued that the decline in the 'productive spending services', such as 'core' infrastructure spending, in the US had largely contributed to the observed productivity decline in the 1970s and the 1980s in the US. More recent studies provided additional evidence on the productivity (and output)

investment in physical infrastructure (e.g. transportation and communication systems) that raise future productivity and output. Non-productive public spending includes certain types of government spending (e.g. social transfers) that has no effect on productivity and output. The second type of spending has high "immediate visibility" and may be considered as popularity-enhancing public spending. See Chapter 3 for more detail.

⁹See Chapter 3 for more detail.

¹⁰Additionally, while early studies emphasized the negative effects of political instability on private investment and hence on output (e.g. Alesina and Perotti, 1996), a number of recent studies underlined the role of political instability on public investment and output growth within a growth framework (see, for instance, Persson and Tabellini, 2000).

enhancing role of public investment (Pereira, 2000; and Mittnik and Neuman, 2001). Findings of these studies suggest that the share of public investment in total public spending should be raised to improve the output potential of an economy.¹¹

The productivity of public investment, such as infrastructure spending, is expected to be high in developing countries (see, for example, World Bank, 1994). This implies that any policy that favors public investment is potentially more beneficial in these countries. However, a number of recent papers have emphasized the detrimental effects of corruption and favoritism on public spending decisions and hence on economic growth (see, for example, Jain, 2001 for a comprehensive survey).¹² It is, for instance, argued that a corrupt government or public sector, especially in developing countries, may choose public projects with considerations other than efficiency that lowers the level of the overall quality and productivity of public investment; thus, it lowers the contribution (beneficial effect) of public investment to productivity and output (see, for example, Mauro, 1997; and Tanzi and Davoodi, 1998, for empirical evidence).

Therefore, the second issue that is considered in Part I is the role of qualitative aspects of fiscal policy making on macroeconomic performance. More specifically, the impact of corruption and favoritism on productive public spending,¹³ and macroeconomic performance will be the main focus.

Keynesian or conventional view suggests that fiscal adjustments are contractionary. However, current line of research provides empirical evidence, notably from the experiences of Denmark and Ireland, on the expansionary consequences (Non-Keynesian effects) of some types of fiscal adjustments (see,

 $^{^{11}\}mathrm{See}$ Chapter 2 for an overview on the role of public investment in productivity and output growth.

¹²See Chapter 2 for more detail and empirical evidence.

¹³The terms "public investment" and "productive public spending" are used interchangeably throughout Part I of this thesis. See Chapter 3 for more detail.

for example, Giavazzi and Pagano, 1990; Perotti, 1996; and Alesina *et al.*, 1998). The main message from this literature is that composition of fiscal adjustments matters for output performance. It is argued that adjustments that entail largely current or social transfer expenditure cuts are expansionary while fiscal consolidations involving largely public investment cuts are shown to be contractionary.

This current line of research is interesting and is worthwhile to study due to several reasons. First of all, it is well known that fiscal adjustment is a central part of the stabilization programs aiming to restore macroeconomic stability. Turkey, for example, is currently undertaking fiscal consolidation, which is specified within the recent IMF-based stabilization program. Additionally, during the 1990s, many industrial and developing countries performed large fiscal adjustments in response to huge deficits experienced during the previous two decades. Moreover, it is observed that many countries succeeded in lowering budget deficits by reducing the share of public investment in total public spending (see, for instance, De Haan *et al.*, 1996: 55). Hence, Part I of this thesis also attempts to provide a political economy explanation to the role of the composition of fiscal adjustments and their consequences for macroeconomic performance.

Several authors have argued in favor of a binding debt rule (a balanced budget rule is a special case) for preventing strategic debt accumulation or myopic public borrowing, possibly resulting from political instability and polarization (see, for example, Dur *et al.*, 1998; and Persson and Tabellini, 2000 for an overview). Such rules, however, have some drawbacks. An important drawback, among others, is that underinvestment may result from a binding debt rule (Dur *et al.*, 1998). It is, for example, widely pointed out that many members of European Monetary Union have cut public investment to grapple with a set of fiscal rules (close to balanced budget rule) imposed on their budget deficits by the Stability and Growth Pact (see, for example, Ballassone and Franco, 2000; and Persson and Tabellini, 2000 for an overview). Similarly, the growth slowdown in Europe after the formation of European Monetary Union has diverted the attention of several authors on such rules (Balassone and Franco, 2000).

Moreover, a number of authors argue that a capital borrowing rule, which allows government to use additional borrowing for financing public investment only, could prevent the strategic political behavior (see, for example, Dur *et al.*, 1998; and Ballassone and Franco, 2000). Similarly, it is also frequently argued that such a rule is "prudent" (see, for example, Buiter, 1998: 1-2). As a result, this rule is frequently referred to as the "golden rule" of public financing and has been applied in many US states and Dutch municipalities (Dur *et al.*, 1998). A similar "golden rule" has been also applied in the UK since 1997, when the new labor party came to power with a promise to reverse a declining trend in public investment (see, for example, Buiter, 1998 for a discussion on the "golden rule" of the UK).

An understanding of the role of public borrowing in general and a capital borrowing rule in particular on public investment and macroeconomic performance is also of paramount importance for the developing countries, due to the following factors. First, political instability and polarization is a persistent and important feature of economic policy making in many developing countries; in other words, political instability and polarization have serious implications for public borrowing and spending decisions. Second, the productivity of public investment is expected to be high in these countries; thus, policies favoring non-productive (popular) spending at the expense of public investment tend to be more harmful for them. Third, domestic borrowing has serious implications on macroeconomic performance in these countries, mainly due to the underdeveloped nature of financial markets.¹⁴ Thus, the final issue

 $^{^{14}}$ See, Agenor and Montiel (1996) for an overview of the characteristics of financial markets in the developing countries. Also see Section 5.1.

that is considered in Part I is the impact of the public borrowing and capital borrowing rule on public spending decisions, especially on public investment, and macroeconomic performance.

1.1.2 An Overview of Part I

Part I consists of four chapters (Chapters 2-5) and concentrates on a set of politico-economic and institutional determinants of macroeconomic policy making and performance. More specifically, it deals with the role of political instability on public spending and borrowing decisions and macroeconomic performance; corruption and quality of public investment; composition of fiscal adjustments; and the capital borrowing rule.

Chapter 2 reviews the literatures on the role of politics on public spending and borrowing decisions and macroeconomic performance. In other words, this chapter reviews the related literatures on the aforementioned issues that are considered in Part I.

Chapter 3 develops the main political macroeconomy model that enables us to analyze the consequences of the two types of public spending on macroeconomic performance. Chapter 3 also provides the basis for the models developed in Chapters 4 and 5. The main findings of this chapter is that the two types of spending have asymmetric effects on future macroeconomic performance. While productive public spending has favorable effects on output and inflation in the next period, popular (or non-productive) public spending has *un*favorable effects. The interesting result is that the beneficial effects of productive spending are not only limited to output and inflation but also includes future popular spending. Main findings of this chapter also hold under both centralized and decentralized policy making frameworks. However, the delegation of monetary policy making to an independent central bank may not necessarily result in better macroeconomic performance (e.g. lower level of inflation), given the favorable effects of productive public spending on future macroeconomic performance.

Chapter 4 investigates the issues related to the political economy of the composition of public spending and fiscal adjustment. It is shown that high level of political instability (via electoral uncertainty) may lead to myopic policies in the form of low level of public investment; thus, results in a worse macroeconomic performance. Similarly, within the context of the political macroeconomy models developed in Chapter 3, political instability and polarization may also lead to populist policies by directly affecting public spending decisions through the sources of political instability and polarization, such as income inequality. Consequently, myopic and populist policies lead to higher inflation, and lower output and public spending; thus, results in a worse macroeconomic performance, albeit in the next period.

Moreover, the findings of Chapter 4 indicate that the favorable effects of productive public spending depends positively on the quality of productive public spending and hence is inversely related to the amount of corruption in the economy. Therefore, qualitative as well as quantitative aspects of fiscal management matter for macroeconomic performance.

Finally, Chapter 4 provides a political economy explanation for the observed expansionary effects of fiscal contractions. In contrast to previous models on Non-Keynesian effects which mainly suggested the favorable wealth and expectations effects of a cut in public consumption on private consumption, Chapter 4 suggest an alternative channel for expansionary fiscal contractions based on the productivity enhancing role of productive public spending. If the incumbent government reduces non-productive (popular) public spending rather than productive public spending, then Non-Keynesian effects are achieved, however if the incumbent does the reverse by reducing productive public spending instead of popular public spending, which is a politically less costly strategy, then the conventional Keynesian effects are achieved. Chapter 5 explores the effects of public borrowing and the capital borrowing rule on public spending decisions and macroeconomic performance. This chapter has extended the models developed in the previous chapters by incorporating the public borrowing decisions into a macroeconomic policy making framework. It is shown that there exists costs versus benefits of borrowing. More specifically, while borrowing rises current public spending, it lowers future public spending. Furthermore, it is shown that high level of political instability (via electoral uncertainty) may lead to myopic behavior in another form: excessive (strategic) debt accumulation. These results are in line with the existing literature.

The main focus of Chapter 5 is on the consequences of public borrowing on productivity enhancing public spending. An interesting and original result from this chapter is that the net effect of productive public spending on next period's macroeconomic performance depends on the benefits of productive public spending relative to the costs of public borrowing. Three cases are identified. For example, when the benefits of productive public spending are equal to the costs of borrowing in the next period, then productive public spending committed in the current period has no effect on macroeconomic performance in the next period. However, if the benefits of productive public expenditures exceeds the costs of borrowing in the next period, then a net effect of productive public spending on next period's macroeconomic performance is favorable. Otherwise, a net effect is *un*favorable.

Moreover, findings of Chapter 5 suggest that even under a capital borrowing rule, higher public investment may yield unfavorable effects on macroeconomic performance in the next period if the benefits of productive public spending are low, e.g. due to low quality, *vis-a-vis* it's costs. Finally, it is shown that the capital borrowing rule does not necessarily prevent the strategic use of public investment, even though it prevents strategic debt accumulation.

1.2 Part II: Macroeconomic Instability, Capital Accumulation and Economic Growth: The Turkish Experience 1963-1999

1.2.1 Introduction to Part II

As mentioned previously, Turkey and many other developing countries, such as those in Latin America, experienced chronic macroeconomic instability by following unstable economic policies, like populist and myopic macroeconomic policies, over extended periods of time.¹⁵ During their chronic instability episodes the typical developing country tends to exhibit excessive and persistent budget deficit, high debt to GNP ratio and high inflation rate. Additionally, most of the countries suffering from chronic macroeconomic instability registered low and volatile rates of capital formation and economic growth. Furthermore, they tend to exhibit low levels of (or declining trend in) public investment as a share of total public expenditures as well as output.

Today, most economists share the view that macroeconomic instability¹⁶ is harmful for capital accumulation and economic growth.¹⁷ That is, a rise in the level of macroeconomic instability, by creating uncertainty about the future as well as the current macroeconomic environment, negatively affects the private investment decisions. This would, in turn, deteriorate capital accumulation and growth. Similarly, a rise in the level of macroeconomic instability, by

¹⁵Developing countries may also experience macroeconomic instability as a result of structural characteristics such as vulnerability to external shocks.

¹⁶Many economists and researchers have used inflation rate as a single indicator of policyinduced macroeconomic instability. However, this study defines macroeconomic instability in a more general way by considering other policy-induced macroeconomic instability indicators, such as public budget deficit to GNP ratio and external debt to GNP ratio, in addition to inflation rate. Therefore, a rise in one or more of policy-induced macroeconomic instability indicators means a rise in macroeconomic instability. This definition is in line with Fischer (1993a ,1993b) and Bleaney (1996). See Chapter 6 for more detail.

¹⁷There is substantial empirical evidence that supports this view. See, for example, Fischer (1993a, 1993b), Sanchez-Robles (1998) and Bleaney (1996).

leading to (or by aggravating) fiscal stringency, has restraining effects on public investments and hence on growth.¹⁸ Thus, macroeconomic instability has negative effects on both private and public investment, albeit through different channels. Additionally, chronic macroeconomic instability may also affect the nature of the relationship between public and private investment (e.g. complementarity) over the long-term, given its differential impacts on public and private investment.

In recent years, the literature on the role of public investment in capital accumulation and economic growth has been one of the most active research areas for both developing and developed countries. There are two related strands of literature on this topic. While the first one focuses on the public capital spending-private investment nexus (e.g. complementarity), the second one focuses on the public investment-output (growth) nexus. Overall, the empirical evidence is mixed in this literature¹⁹ (see Blejer and Khan, 1984; Agenor and Montiel, 1996; Gramlich, 1994; Agenor, 2000; and Sturm *et al.*, 1998) and most of the early studies on the two related strands of literature have been criticized on empirical grounds. The principal empirical criticisms are: ignoring the simultaneity and the reverse-causation, and the spuriousness of the empirical results (see, for example, Munnel, 1992; Pereira, 2000; and Sturm *et al.*, 1998).

To overcome these empirical problems, recent studies have used modern time series techniques, such as multivariate cointegration and impulse response analyses to analyze the effects of public investment on private investment and output (Ghali, 1998; Pereira, 2000; and Mittnik and Neumann, 2001). However, the effects of macroeconomic instability on private and public capital formation as well as on economic growth have not been investigated in the

¹⁸It is politically more easier to cut public investment rather than popular spending, such as public consumption and social transfers, in the case of fiscal stringency. See, for instance, De Haan *et al.* (1996).

¹⁹This is also the case for the Turkish economy. See Chapter 6 for more detail.

recent literature. Therefore, the principal purpose of Part II of this thesis is to extend the recent empirical studies in the literature on the role of public investment in capital accumulation and economic growth, by including macroeconomic instability and considering the Turkish experience. More specifically, Part II focuses on the effects of macroeconomic instability on public and private investment as well as on the nature of their relationships and economic growth in the Turkish economy over the 1963-1999 period.

Turkey seems to be a good case study given its recent experiences with chronic macroeconomic instability over the last three decades. The importance of Part II of this thesis also stems from two main policy concerns for Turkey:

1) most of the elected governments (from the mid-1970s onwards) in Turkey either delayed or did not continue the stabilization programs due to political concerns.²⁰ However, as the existence of (chronic) high level of macroeconomic instability is expected to adversely affect capital accumulation and economic growth, the restoration of macroeconomic stability is crucially important for stable and sustainable economic growth,

2) policy makers in Turkey are currently combating a battle against chronic macroeconomic instability by implementing a stabilization program, of which fiscal adjustment is a central part. If public investment, or its infrastructural component, is complementary to private investment; then, the reduction of public investment, in the process of the restoration of macroeconomic stability, may deteriorate the economic growth.

Thus, Part II of this thesis attempts to shed some light on these policy issues for the Turkish economy.

 $^{^{20}\}mathrm{See}$ Chapter 7 for an overview.

1.2.2 An Overview of Part II

Part II is comprised of three chapters (Chapters 6-8) and focuses on the impacts of macroeconomic instability on public and private investment as well as on the nature of their relationships and economic growth in the context of the Turkish economy over the 1963-1999 period.

Chapter 6 reviews the literatures on the role of public investment and macroeconomic instability in capital accumulation and economic growth. Chapter 7 provides a condensed overview of public spending dynamics, macroeconomic instability, investment and growth processes in the Turkish economy over the 1963-1999 period.

Chapter 8 investigates the empirical relationships between macroeconomic instability, public investment, private investment and output in Turkey for the 1963-1999 period by using modern time series techniques. Particularly, this study estimates the long-run relationship(s) between public investment, private investment, macroeconomic instability and output in Turkey for the period 1963-1999 by using multivariate (system) cointegration analysis. It also provides the generalized impulse response functions to examine the dynamic (short and medium-term) effects of a rise in a given variable of interest, e.g. macroeconomic instability, on all the other variables in the system. As suggested by many researchers (e.g. Blejer and Khan, 1984), aforementioned ambiguity in the empirical studies on the role of public investment in capital accumulation and economic growth might be the result of using aggregate rather than disaggregated public investment data, such as infrastructural public investment. Therefore, the empirical analysis is also extended by considering the infrastructural component of the public investment.

Evidences from both the descriptive analysis (Chapter 7) and the formal econometric analysis (Chapter 8) suggest that the chronic and increasing macroeconomic instability has been very costly for the Turkish economy in terms of capital accumulation and economic growth. Furthermore, the Turkish experience has also shown that macroeconomic instability not only deters economic growth but it may also reverse the complementarity between public and private investment in the long-run.

Finally, Chapter 9 provides the overall conclusions for both Part I and Part II of this thesis.

Part I

Politics, Public Spending, Borrowing and Macroeconomic Performance
CHAPTER 2

POLITICS, PUBLIC SPENDING, BORROWING, AND MACROECONOMIC PERFORMANCE: A REVIEW OF RELATED LITERATURE

2.1 Introduction

Many economists nowadays share the view that politics and economics are intensely interrelated. In line with this view the political economy literature has become an important and an exciting research area both for macroeconomists and development economists. Most of the studies in this literature assume that politicians are *opportunistic* and mainly motivated by re-election. In the words of Alesina:

Politicians are described as being driven by two, not mutually exclusive, main motivations: they want to be reelected and they harbour political, or ideological biases (Alesina, 1989: 55).

Additionally, recent political economy studies have emphasized that sociopolitical and institutional factors may have serious consequences on macroeconomic policy making and resultant outcomes (see, for example, Drazen, 2000; Persson and Tabellini, 2000; and Romer, 2001 for an overview).¹

Therefore, the main objective of Part I is to develop political macroeconomy models to analyze the role of a set of politico-economic and institutional factors on public spending and borrowing decisions and macroeconomic performance, by focusing on the productivity enhancing role of public investment. More specifically, Part I deals with the role of political instability on public spending and borrowing decisions and macroeconomic performance; composition of fiscal adjustments; capital borrowing rule; and the role of corruption on quality of public investment and macroeconomic performance.

This chapter provides a selective and condensed overview of the related literature on these issues as well as on the productivity enhancing role of public investment. These issues are the main focus of the theoretical chapters of Part I; namely, Chapters 3-5. The rest of this chapter is organized as follows. Section 2.2 provides an overview of the literature on the relation between public investment spending and productivity and output. Section 2.3 reviews the political economy determinants of public spending and borrowing decisions and resultant macroeconomic performance. Section 2.4 reviews the impact of corruption and favoritism on public spending decisions, especially on productive public spending, and macroeconomic performance. Section 2.5 provides a summary of the literature on the expansionary fiscal adjustments. Finally, Section 2.6 concludes the chapter by providing a road map for the rest of Part I of this thesis.

¹Most of the recent studies are currently grouped under two headings: *new political economy* and *political macroeconomy*. See, for example, the special issues in the volumes 14 and 15 of *Journal of Economic Surveys* (published in 2001) for an overview of these two literatures.

2.2 Public Investment, Productivity and Output: An Overview

Public spending could positively affect productivity and output at least through the following two channels:²

- A rise in public spending, e.g. public investment, contributes to capital accumulation; thus, output.
- Similarly, a rise in productive public spending, such as spending on education, health and infrastructure, raises productivity and hence output.³

Starting with the seminal works of Aschauer (1989a,b), many studies found a significant link between infrastructure spending and productivity. Aschauer claimed that the decline in productive public expenditure, such as 'core' infrastructure spending, had significantly contributed to the observed productivity decline in the 1970s and the 1980s in the US. By utilizing a production function framework, he found that a "core" infrastructure, such as highways and airports, has strong explanatory power for productivity in the US. He also found a strong positive relationship between average annual labor productivity and public investment-gross domestic output ratios for the period 1973-85 for "G-7" countries (Japan, France, Germany, UK, Italy, Canada, US). Simple regression of this productivity measure on public investment-GDP ratio yields a significant slope coefficient of 0.47 (Aschauer, 1989a: 198).

Moreover, Easterly and Rebelo (1993) found significant correlation between investment in transport and communication and growth. These authors also

 $^{^{2}}$ This section provides a condensed overview of the literature on the role of public investment on productivity and output. See Chapter 6 for more detail.

³See Chapter 6 for more formal exposition on these two channels.

claimed that the causality runs from public investment to growth rather than the other way round.

Similarly, World Bank (1994:2) argued that "[g]ood infrastructure raises productivity and lowers productions costs, but it has to expand fast enough to accommodate growth". Furthermore, World Bank (1993) mentioned the important role of infrastructure investment in the attainment of high growth rate in East Asian countries.

Moreover, according to Rapley (1996: 83), a private firm might not construct its planned factory unless the government provides road, electricity, and sewerage system; therefore, private firms or entrepreneurs wait for the first move from the government.⁴

Even though a considerable number of studies have found positive effect of total public investment on output, the overall evidence is mixed (see, for instance, Sturm *et al.*, 1998 and Agenor, 2000). Additionally, most of the early studies in this field were criticized on empirical grounds such as endogeneity and spuriousness of the results. However, many economists share the view that public investment in infrastructure is favorable to productivity and output. Furthermore, more recent studies, by utilizing modern time series techniques, provided additional evidence on the favorable effects of public investment, especially infrastructure spending, on productivity and output (Pereira, 2000; and Mittnik and Neumann, 2001).⁵

⁴It should be also mentioned that several theoretical studies on the favorable role of public infrastructure investment on private capital accumulation, productivity and output assumes that public investment committed in the current period becomes productive in the next period (see, for example, Rogoff, 1990; and Persson and Tabellini, 2000). Section 2.3.2 provides more detail on these studies. Also see Blejer and Khan (1984) for similar argument on the crowding-in effect of public infrastructure investment on private investment.

 $^{^5 \}mathrm{See}$ Chapter 6 for more detail.

2.3 The Role of Socio-Political Factors on Public Spending, Borrowing and Macroeconomic Performance

This section provides a selective review of the literature on the role of sociopolitical instability and polarization on public spending and borrowing decisions as well as on macroeconomic performance.

Political instability can be viewed in two ways, as indicated by Alesina and Perotti (1996):

The first one emphasizes executive instability. ... [That is, it] defines political instability as the 'propensity to observe government changes'. These changes can be 'constitutional' or ... 'unconstitutional' ... The second one is based upon indicators of social unrest and political violence (Alesina and Perotti, 1996: 1205).

It is clear from the above definition(s) that one of the ways that political instability manifests itself is through elections. However, socio-political instability may also be directly reflected in public decisions (e.g. public spending decisions) due to the characteristics of the socio-political structure, such as income inequality, social fractionalization, and political polarization. Nevertheless, the electoral process itself also depends on the socio-political structure of the society.

Therefore, firstly Section 2.3.1 will review the role of the characteristics of the socio-political structure on public spending decisions and then Section 2.3.2 will review the role of electoral uncertainty on public spending and borrowing decisions.

2.3.1 Inequality, Fractionalization, Polarization and Populism

Several authors argued that high degree of income inequality, social fractionalization and polarization lead to a high level of political instability and polarization (see, for example, Alesina and Perotti, 1996; Easterly and Levine, 1997; and Annett, 2001) and, in turn, affect the public spending decisions of the incumbent governments.⁶

It is widely argued that the demand for redistributive public spending, e.g. public wage and social transfer increases, is higher the higher is the degree of income and wealth inequality (see, for example, Alesina and Rodrik, 1994; and Benabou, 1996). In other words, governments in more unequal societies have more incentives to follow populist policies which contain redistributive public spending. Dornbusch and Edwards (1990, 1991) provide evidence on the links between income inequality and macroeconomic populism and stability, based on Latin American experience (Also see a similar arguments by Onis, 1997, 2002 for Turkey).⁷

More recently, several studies have emphasized that higher level of social or ethnic fractionalization may also lead to a higher level of government consumption spending directed at lowering the level of "political risk" or "placating excluded groups" (see, for example, Annett, 2001). Similarly, Easterly and Levine (1997) argued that the political instability and insufficient infrastructure in Africa is associated with Africa's high ethnic fragmentation.

Political polarization also has similar effects on public spending decisions. For example, compared to politically strong governments, politically weak gov-

⁶There is also considerable empirical evidence that high degree of income inequality, social fractionalization result in lower rates of (private) capital formation and economic growth, by leading to a high level of political instability (see, for example, Alesina and Perotti, 1996; Benabou, 1996; Easterly and Levine, 1997; and Annett, 2001). Also see Persson and Tabellini (2000) for more detail and overview.

⁷See Chapter 6 for more detail.

ernments, tend to cut public investment rather than current expenditure (see, for example, Roubini and Sachs, 1989a for empirical evidence).

2.3.2 Electoral Uncertainty, Myopia and Strategic Political Behavior

The existence of electoral uncertainty usually leads to myopic or short-sighted policy makers with high rate of time preference. Moreover, it is frequently argued that high level of political instability and polarization (via electoral uncertainty)⁸ may lead to strategic political behavior and myopic policies in the forms of excessive debt accumulation (or inefficiently high budget deficits) and low level of public investment. Therefore, this sub-section reviews the role of electoral uncertainty on public spending and borrowing decisions as well as on budget deficits and inflation. Main emphasis will be given to the role of strategic political behavior resulting from electoral uncertainty. Moreover, final part of this sub-section will provide an overview of borrowing rules, such as balanced budget and capital borrowing rules, that are suggested for preventing strategic political behavior.

Strategic Use of Public Debt, Inefficient and Persistent Budget Deficits, and Inflation

Public debt is an *inter*temporal policy tool that connects *current* government to *uncertain* future government. This creates an occasion for incumbent government to enjoy the benefits of borrowing today by spending more, and burdening it's successor with large debt that limit its spending. In the words of Dornbusch and Draghi (1990),

 $^{^{8}}$ A high degree of political instability tends to lead to a high probability that the incumbent government may be voted out of office (see, for example, Beetsma and Bovenberg, 1997b; and Cukierman *et al.*, 1992).

[d]ebt links one government to another, it affords the possibility of reaping benefits today at the cost of another administration or it creates an opportunity to limit the scope for action of one's successor (Dornbusch and Draghi, 1990: 11).

Given the intertemporal nature of public debt and the existence of electoral uncertainty, a high level of political instability may lead to a myopic behavior in the form of inefficient budget deficits and excessive (strategic) debt accumulation, by lowering the probability of re-election at the end of the current period. In other words, if the incumbent government faces a high probability of being voted out of office at the end of current period, then it may accumulate excessive amount of public debt to tie the hands of it's successor or political competitor in the next period. That is, the incumbent lowers the popularity of it's successor, which may have different political preferences, by restraining it's public spending via constraining it's resources (see, for example, Persson and Svensson, 1989; Alesina and Tabellini, 1990). Alternatively, the incumbent government may use debt policy strategically to increase it's re-election probability (see, for instance, Aghion and Bolton, 1990).

The strategic behavior that is considered above is due to the high level of political instability that lowers the probability of re-election in the next period; therefore, the strategic behavior results from the strategic interactions between different periods. However, strategic behavior may also result from another feature of the political structure: political polarization.⁹ That is, strategic behavior may also arise in each period due to the conflicting interests of political interest groups, e.g. coalition governments (See, Persson and Tabellini, 2000, for more detail). Similarly, strategic behavior may result from

⁹In reality, political instability and polarization are highly correlated. As noted by Persson and Tabellini (2000: 367) "it is difficult to discriminate empirically among these two features [political instability and polarization], since they often tend to come together: coalition governments are generally short-lived." Therefore, the frequently used term "political instability" usually has the meaning of both political instability and polarization in this study, unless otherwise stated.

the differences in the form of institutional setting between fiscal and monetary authorities (see, for example, Beetsma and Bovenberg, 1997b).

In summary, the main result from the political economy theories of public debt is that political factors (e.g. strategic political behavior) are crucial determinants of public debt policy. See, for example, Drazen (2000), Persson and Tabellini (2000) and Romer (2001) for a comprehensive survey of political economy theories on public debt and inefficient budget deficits.

Seigniorage is an important source of revenue for many developing countries. It is frequently argued that high level of political instability may also lead to monetary (as well as fiscal) irresponsibility and hence high and persistent inflation (see, for instance, Healey and Page, 1993). New political economy theories on inflation¹⁰ suggest that myopic policy makers or governments, such as those having an election in horizon, are more inclined to benefit from short-term policies that rises inflation (see, Kirshner, 2001; and Persson and Tabellini, 2000, for an overview). Therefore, there is a possibility of political business cycle due to political manipulation of inflation. Similarly, Cukierman et al. (1992), by developing a political economy model of tax reforms, argue that the incumbent government delays the tax reform and relies more on seigniorage if she faces a low probability of re-election and opposition. In order to insulate inflation from short-term political manipulations and to achieve credible monetary policy, many studies in this literature suggested an institutional solution: central bank independence (see, Kirshner, 2001, for an overview).

Roubini and Sachs (1989b) provides a formal evidence on the effects of political instability (polarization) on the debt accumulation for industrial countries. Moreover, Persson and Tabellini (2000) provides a review of the empirical evidence on the political determinants of large or inefficient budget deficits and

 $^{^{10}}$ See Kirshner (2001) for a recent survey on theoretical perpectives, such as sociological and political perspectives, on inflation.

public debt.¹¹ There is also considerable evidence on the effects of political factors on budget deficits and inflation in developing countries.¹² Edwards and Tabellini (1991) and Roubini (1991), for example, argue that governments which are composed of short-lived and large (as well as unstable) coalitions are associated with large budget deficits. Similarly, Cukierman *et al.* (1992) provide evidence on negative effect of political instability on seigniorage and hence inflation. Moreover, several authors (Haggard, 1991 and Haggard and Kaufman, 1990)¹³ argue that there is a correlation between the patterns of inflation and political events in some Latin American countries (Argentina, Brazil, Uruguay and Chile). Also see Agenor and Montiel (1996) for a review of the formal and descriptive empirical evidence on the political determinants of budget deficits and inflation in developing countries.¹⁴

A related strand of work in new political economy literature focuses on the persistence of high budget deficits once it arises. Budget deficits may persists due to the conflict over how the burden of fiscal adjustment will be distributed among the two powerful interest groups or political parties in a coalition. Each interest group (or a political party in a two-party coalition) delays agreeing on stabilization program with the expectation that the other will bear the higher proportion of the burden of fiscal adjustment (e.g. agreeing to pay a higher proportion of the taxes). The seminal work in this strand of literature is the "war of attrition model" of Alesina and Drazen (1991). In this model, higher degree of political fragmentation, which usually leads to higher level of political instability and polarization, is a crucial factor leading to delays of fiscal adjustment or stabilization (see, for example, Veiga, 2000 for empirical

¹¹Also see Romer (2001).

¹²Budget deficits are usually considered as one of the main cause of high and persistent inflation rate in developing countries, especially in those with structural problems (e.g. inefficiencies in tax collection). See, for example, Agenor (2000) and Veiga (2000).

¹³These studies are cited in Agenor and Montiel (1996).

¹⁴Similarly, political business cycles and political economy of stabilization and structural adjustment have also become an important research area for both industrial and developing countries. See, for example, Agenor and Montiel (1996) and Persson and Tabellini (2000) for an overview.

evidence).¹⁵

Strategic Use of Public Investment

Similar to public borrowing, public investment also has an *inter*temporal characteristic; that is, it can expand future productivity and output and thus links current government to uncertain future government. Therefore, while the costs of spending more on public investment, in terms of lost spending in other categories of public expenditure (due to the budget constraint), are borne by current government, uncertain future government reaps the benefits of public investment. Hence, this *inter*temporal nature of public investment also creates a possibility for strategic political behavior.¹⁶

Persson and Tabellini (2000), for example, analyzed the role of electoral uncertainty on public investment and economic growth. If there is a high probability that the incumbent government may not be in the office in the next period, e.g. due to a high level of political instability, to realize the favorable effects of public investment committed in the previous period, then the incumbent lowers public investment. As a result, economic growth suffers from such myopic behavior.

Rogoff (1990) developed a rational political business cycle model for fiscal policy.¹⁷ He has shown that incumbents, prior to elections, tend to favor public consumption and social transfer spending, which have high "immediate visibility" for voters instead of public investment that becomes visible and productive in the next period. In this set-up, electoral and budget cycles arise from informational asymmetries between policy makers and voters.

 $^{^{15}}$ Veiga (2000) explains and provides empirical evidence on various political barriers to stabilization.

 $^{^{16}}$ See also Dur *et al.* (1998) on the idea of strategic use of public investment.

¹⁷This model is also referred to as a *rational political budget cycle* model.

Moreover, it is frequently claimed that myopic governments that have a high rate of time preference inclined to favor current public spending rather than public investment. See, for example, De Haan *et al.* (1996) and Agenor and Montiel (1996) for evidence on developed as well as developing countries.

Binding Debt Rules: Balanced Budget Rule Vs. Capital Borrowing Rule

In order to prevent strategic debt accumulation several authors proposed a binding debt rule of which balanced budget rule is a special case (see, for example, Dur *et al.*, 1998; and Persson and Tabellini, 2000 for an overview). However, these sort of rules have some drawbacks. For example, a binding debt rule, such as balanced budget rule, may restrain stabilization policy. More importantly, Dur *et al.* (1998) state that underinvestment may result from a binding debt rule:¹⁸

a binding debt rule shifts strategic manipulation by politicians to other parts of public policy. ... [That is,] policy makers will use the other instrument of intertemporal nature: they will lower public investment in order to soften their budget constraint at the expense of future income (Dur *et al.*, 1998: 2-3).

Persson and Tabellini (2000: 367) argue that "this result is consistent with the recent behavior of many European states that have cut public investment to cope with the constraints on budget deficits imposed by the Stability [and Growth] Pact."

Given the strategic political role of public debt policy as well as public investment, a number of authors argue that the capital borrowing rule, which

¹⁸Dur *et al.*'s (1998) model assumes that public investment does not yield direct utility but creates additional resources in future periods. See Dur *et al.* (1998) for more detail on their model.

allows government to use additional borrowing for financing public investment only,¹⁹ could prevent the strategic use of public spending and borrowing policies (Dur *et al.*, 1998). Additionally, it is also frequently argued that such a rule is "prudent" since it prevents government to finance current spending with borrowing, which usually requires painful or unpopular "corrections", such as future public spending cuts or tax increases, for future fiscal balances or results in a rise in inflation (due to monetization) or further borrowing (see, for example, Buiter, 1998: 1-2). Thus, the capital borrowing rule is frequently called as "golden rule" of public financing (See, Dur *et al.*, 1998; and Ballassone and Franco, 2000). This rule has been applied in many US states and Dutch municipalities (Dur *et al.*, 1998).

In 1997, a new labor party came to power with a promise to reverse a declining trend in public investment in the UK. In line with this promise, a government launched a similar "golden rule", i.e. "over the cycle, governments can borrow only to finance capital formation, or the government's current budget is to be balanced over the cycle" Buiter (1998: 1). Buiter (1998) analyzed the merits and the role of the "golden rule" of UK on government's solvency and fiscal stability. He concluded that "the golden rule is without merit but ... subject to some important caveats". One of the main results of his analysis, which is related to government's solvency and fiscal stability, is that

[i]f the government's cost of borrowing exceeds (falls short of) the cash rate of return on public sector capital, future primary current surpluses will have to be correspondingly higher (lower). ... if the gross cash rate of return were to equal to zero, public sector investment is just like public sector consumption (Buiter, 1998: 6).

¹⁹If we make a distinction between current and capital expenditure, capital borrowing rule implies that government should have a balanced current spending budget (see, for example, Buiter, 1998: 1).

Thus, he concluded that a capital borrowing rule is not "prudent".

In a recent study by Ballassone and Franco (2000), the pros and cons of introducing a 'golden rule' in the fiscal framework of the European Monetary Union have been analyzed.

2.4 Corruption and Public Investment

Recent line of research have emphasized the detrimental effects of corruption and favoritism on economic policy making and hence macroeconomic performance, e.g. economic growth (see, for example, Jain, 2001, for a comprehensive survey). Mauro (1997) and Tanzi and Davoodi (1998) provide empirical evidence on the negative effect of corruption on investment and economic growth.

It is frequently argued that the returns from infrastructure spending are expected to be higher in developing countries (see, for example, World Bank, 1994). However, as pointed out by World Bank (1994) the quantity as well as quality of the provision of infrastructure is crucial for better economic performance.²⁰

Therefore, the size of the beneficial effect (or productivity) of productive public spending, such as public infrastructure, on macroeconomic performance positively depends on the quality of productive public spending and hence the amount of corruption in the economy (Mauro, 1997; Tanzi and Davoodi, 1998; and Jain, 2001). For example, Mauro (1997) states that:

Public officials are more likely to do favors for their relatives in societies where family ties are strong ... The allocation of public procurement contracts through a corrupt system may lead to lower quality

 $^{^{20}}$ World Bank (1994) also discusses the ways for improving the quality of the provision of infrastructure.

of infrastructure and public services. ... [W]hile bribes are difficult to levy on teachers's salaries, they're easier to levy on the construction of school buildings and other capital expenditures ... [e.g.] large infrastructure projects ... Most people suspect that corruption leads to high capital expenditure on "white elephant" projects (grandiouse presidential palaces, unnecessarily large airports, or vast university campuses) (Mauro, 1997).

Thus, corrupted government or public sector may choose public projects with considerations other than efficiency, that lowers the level of overall quality and hence overall productivity of productive public spending. Therefore, favorable effects of productive public spending depends on the amount of corruption in the economy. So the important question is: What determines the amount of corruption in a given economy? Several authors argued that social fractionalization and socio-political polarization are among the crucial determinants of the amount of corruption (see, for example, Easterly and Levine, 1997, and Mauro, 1997, for empirical evidence).²¹ Therefore, socio-political characteristics that affect the degree of political instability and polarization are likely to affect the amount of corruption in the economy.

2.5 Expansionary Fiscal Adjustments

As opposed to the conventional or Keynesian view that fiscal adjustments are recessionary, there is growing empirical evidence that some types of fiscal adjustments may be expansionary; in other words, it is claimed that the composition of fiscal adjustment matters for productivity and output (see, for example, Giavazzi and Pagano, 1990; Perotti, 1996; Alesina and Ardagna, 1998; Alesina *et al.*, 1998; and Perotti, 1996, 1999). This current line of research emphasizes

²¹See Mauro (1997) and Jain (2001) for a comprehensive list of the causes of corruption.

that if government reduces public investment spending rather than popular public spending, e.g. current public spending or transfer expenditures, then the conventional Keynesian effects are achieved; however, if government reduces popular public spending rather than public investment spending, then Non-Keynesian effects are achieved. That is, while the former type of fiscal adjustment is recessionary, the latter type is expansionary.

Previous theoretical models on the Non-Keynesian effects mainly suggested the favorable wealth effects of a cut in public consumption on private consumption along the neoclassical lines (see, for example, Giavazzi and Pagano, 1990; and Alesina and Ardagna, 1998).²² The other frequently mentioned channel is through the credibility effects on interest rates. Public debt may face high risk premium at high or rapidly rising levels of debt to GNP ratio, due to default and inflation risk on borrowing. A fiscal adjustment, if it is believed to be permanent and successful, may have immediate political credibility and expectation effects which will lower expected inflation and inflation risk on borrowing, and hence result in a 'discrete' fall in real interest rates (see, for example, Alesina and Ardagna, 1998).

Nevertheless, as pointed out by many authors (see, for example, Perotti, 1999; and Alesina and Ardagna, 1998) initial conditions are important. Fiscal consolidations based on current spending may be expansionary under certain conditions, such as high level of debt to GNP ratio (see, for example, Perotti, 1999).

2.6 A Road Map for the Rest of Part I

This chapter has selectively reviewed the literatures on the main issues of Part I. The remainder of Part I is organized as follows. Chapter 3 develops the basic

 $^{^{22}\}mathrm{See}$ Alesina and Ardagna (1998) and Romer (2001) for comprehensive analysis of this literature.

macroeconomic framework that enables us to investigate the consequences of the two types of public spending (productive vs. non-productive public spending) on macroeconomic performance. This chapter also provides the basis for the models developed in Chapters 4 and 5. Chapter 4 investigates the issues related to political economy of the composition of public spending and fiscal adjustment. Chapter 5 explores the effects of public borrowing and the capital borrowing rule on public spending decisions and macroeconomic performance.

CHAPTER 3

THE IMPACT OF PRODUCTIVE VS. NON-PRODUCTIVE PUBLIC SPENDING ON MACROECONOMIC PERFORMANCE

3.1 Introduction

Government's decision regarding the allocation of available resources to different types of public spending is a crucial issue both from economic and political points of view. For example, if the incumbent decides to spend on public infrastructure rather than on popular categories (e.g. social transfers), this decision may have crucially different macroeconomic and political consequences. Following the pioneering works of Aschauer (1989a,b), many studies found a significant link between infrastructure spending and productivity (and output).¹ The findings of these studies imply that the share of public investment in total public spending should be raised to improve the output potential of an economy. Therefore, the government's decision to spend on public infrastructure rather than on popular spending can be a sound and feasible option

 $^{^1 \}mathrm{See}$ Chapter 2 for more detail and evidence on the link between productive public spending and productivity.

from an economic point of view. However, from a political point of view, this decision can be very costly in terms of the popularity of the incumbent government, especially prior to elections. That is, this decision of the incumbent may significantly reduce it's chance of re-election, particularly in developing countries that have an unstable political environment.²

Therefore, at an analytical level, it is useful to make a distinction between productive and non-productive public spending. This distinction is generally made on the basis of whether a given type of public spending is included as arguments in the production function or not (see, for example, Barro and Sala-i-Martin, 1995; and Kneller et al., 1999). If it is (not) included as an argument, then, it is classified as productive (unproductive³) public spending and hence has (no) direct effect on output and growth. For example, according to Kneller et al. (1999), while communication, transport, health and education are among the main productive spending categories, social security spending is the main non-productive spending category.⁴ Many other researchers (e.g. Turnovsky and Fisher, 1995; Rogoff, 1990; and Dur et al., 1998) have made a similar analytical distinction between public expenditures on the similar grounds. Turnovsky and Fisher (1995), for example, distinguished between government "consumption" expenditure (e.g. public spending on various social programs and national parks) that "provides direct utility to households" and government infrastructure expenditure (e.g. public spending on bridges, roads and education) that "raises the productive capacity of firms".

In line with these classifications, this Ph.D. study differentiates between productive and non-productive public spending simply based on the notion that if a given type of public spending raises the overall productivity (and

²See Chapter 2 for more detail.

 $^{^{3}\}mathrm{The}$ terms "non-productive" and "unproductive" are used interchangeably throughout this thesis.

 $^{^{4}}$ In empirical analyses it is difficult to classify certain types of public expenditures as productive or not; however, expenditures with a substantial physical and human capital component are generally viewed as "productive" (see, for example, Kneller *et al.*, 1999, for more detail and references).

hence included as an argument in production function)⁵ it is classified as productive spending otherwise it is classified as unproductive public spending. Productive public spending includes public expenditure on physical infrastructure (e.g. transportation and communication systems) and also other types of spending, for instance, R&D and education, that have positive effect on overall productivity and hence on output potential. In contrast, non-productive public spending includes redistributive spending,⁶ such as social transfers and public wage increases, and other types of government spending (e.g. national parks) that has no effect on productivity and output. However, as noted by Rogoff (1990), many types of non-productive spending such as social transfer spending have high "immediate visibility" for voters; however, productive spending such as public investment *usually* becomes visible and productive in the next period.⁷ Therefore, unproductive public spending may also be considered as popularity-enhancing public spending or simply popular spending.

To analyze the role of the preferences, incentives as well as constraints of the policy maker on the decisions concerning the allocation of available resources between productive and non-productive public spending (i.e. the choice on the composition of public spending) and the link between these decisions and the overall economic performance a discretionary model of macroeconomic policy making rather than a growth model, will be developed in this chapter as well as in Part I of this thesis. In other words, Part I is *not* concerned with the analysis of the role of productive versus non-productive public spending on steady-state growth rate, which is studied by other researchers within a

⁵It should be noted at the outset that in our framework the only way that the productive public spending can be considered as an argument in production function is via the productivity term. However, productive public spending could also be possibly considered as a capital stock. This is possible in some theoretical frameworks, e.g. in a growth theory framework (See Chapter 6 for more detail).

⁶It should be also noted that certain types of public spending such as redistributive public spending aimed at poverty alleviation is socially useful especially in countries having high level of income inequality. Thus, such policies may contribute towards economic development in the long-term.

⁷Also see Dur *et al.* (1998) for similar arguments.

growth theory framework (see, for example, Devarajan *et al.*, 1996).⁸ Instead this study is mainly concerned with the medium-term effects of the composition of public spending on such key macroeconomic indicators as output, inflation and overall public spending.

To this end, initially a simple model of discretionary⁹ monetary and fiscal policy is utilized as a *benchmark* model (in Section 3.2). Variants of this *benchmark* model are used, for example, by Alesina and Tabellini (1987), Jensen (1994), Debelle and Fischer (1994), Beetsma and Bovenberg (1997a, 1997b, 1999) and Ozkan (1998, 2000) in the analysis of various political macroeconomy and related institutional issues; such as, monetary policy and public debt issues; central bank independence; monetary unification; and political business cycles. However, a common feature of the benchmark model or in those "variants" is that public spending is totally unproductive. In other words, public spending is regarded as having no favorable effect on productivity and potential output.

This chapter extends the benchmark model into a simple dynamic (twoperiod) model by incorporating the productivity enhancing role of public spending. In other words, this chapter develops the basic macroeconomic framework of Part I by linking the overall macroeconomic performance of an economy to the public spending decisions. This will enable us to investigate the consequences of the two types of public spending (productive vs. non-productive public spending) on macroeconomic performance. Furthermore, this chapter also provides the basis for further extensions in Chapters 4 and 5 of Part I.

Additionally, the framework of the benchmark model is flexible with respect to the institutional structure of macroeconomic policy making and allows us to

 $^{^{8}}$ See also Turnovsky and Fisher (1995).

⁹A macroeconomic model of *discretionary* monetary and fiscal policy making is considered since policy makers usually *fail to make credible commitments* (see Agenor and Montiel, 1996, for an overview and evidence from developing countries); however, the main results in this and the following sections also hold qualitatively for the commitment case.

analyze both the centralized and the decentralized structure.¹⁰ This flexibility is important given the concerted efforts by many industrial and developing countries delegating monetary policy making powers to independent central banks since the late 1980s.

The remainder of this chapter is organized as follows. Section 3.2 presents the benchmark model, where public spending is totally non-productive, and describes the main features of it. Section 3.3 develops this benchmark framework into a two-period, simple dynamic model by considering the productivity enhancing role of public spending. The policy maker's choice of fiscal policy is generalized first, by incorporating productive spending to the framework, and, then, the role of productive vs. non-productive public spending on the overall macroeconomic performance is analyzed in Section 3.3. Section 3.4 extends the analysis of the previous sections by considering decentralized macroeconomic policy making. Finally, Section 3.5 concludes the chapter.

3.2 The Benchmark Model

This section presents the $centralized^{11}$ benchmark model and describes the main features of it.

¹⁰While the government is the only authority actively designing both the monetary and fiscal policies in the centralized macroeconomic policy making framework, monetary policy making is in the hands of an independent central bank in the decentralized macroeconomic policy making framework.

¹¹A policy making framework of this model is such that a single (central) authority is responsible for both fiscal policy and monetary policy.

3.2.1 Model

Output

A representative competitive firm faces the following production function: $Y_t = N_t^{\gamma}$, where Y_t and N_t represent output and labor in period t, and $0 < \gamma < 1$. Therefore, the output supply function in Equation (3.1) represents the optimal output derived from representative competitive firm's profit maximization problem (see Appendix A for the derivation of Equation (3.1))

$$x_t = \alpha (\pi_t - \pi_t^e - \tau_t) \tag{3.1}$$

where x denotes normalized (log) output, π denotes the inflation rate, τ denotes the tax rate on the total revenue of firms and superscript e denotes expectation.

Preferences and the Budget Constraint of the Policy Maker

Consider a central policy maker whose preferences can be summarized by the following loss function

$$L_t^G = \frac{1}{2} \bigotimes_{t=1}^{\mathcal{H}} \beta_G^{t-1} [\delta_1 \pi_t^2 + (x_t - \overline{x}_t)^2 + \delta_2 (g_t - \overline{g}_t)^2]$$
(3.2)

where L_t^G represents the welfare losses incurred by the government, β_G denotes the government's (G) discount factor and δ_1 and δ_2 denote, respectively, government's relative dislike for the deviations of inflation (π) and unproductive public spending as a ratio of output (g) from their target levels ($\overline{\pi}$ and \overline{g})¹² relative to the deviations of (log) output (x) from its target level (\overline{x}).

¹²Inflation target ($\overline{\pi}$) is assumed to be zero for simplicity.

Equation (3.2) reveals that policy maker dislikes the deviations of inflation, output and public spending from their target levels. A non-zero output target \overline{x} could possibly represent the first best-level of (or bliss point for) output; that is, the level of output without both tax and non-tax distortions (e.g. due to labor market imperfections). Similarly, a non-zero public spending target \overline{g} could represent the optimal share of output on public spending. Nevertheless, the target levels of output and public spending (\overline{x} and \overline{g}) as well as weights attached to these targets (δ_1 and δ_2) reflect the political and the institutional structure of the economy (see Chapter 4 for more detail).

The budget constraint of the government is given as follows

$$g_t = \tau_t + \pi_t \tag{3.3}$$

This budget constraint indicates that distortionary taxes and seigniorage are the two sources of financing for the government outlays.¹³ The budget constraint creates the link between the monetary and fiscal policies. (see Appendix B for the derivation of Equation (3.3))

3.2.2 Features of the Equilibrium

In this model, the central policy maker (government) controls both fiscal and monetary policies. Also the policy maker is assumed to control directly the inflation rate (π) by controlling nominal money supply.¹⁴ Additionally, the policy maker sets the tax rate (τ) and government spending (g). Furthermore, monetary and fiscal policy decisions are made simultaneously.

¹³Borrowing is excluded as a source of finance. The issues of public borrowing will be considered in Chapter 5.

¹⁴This follows from the assumption that money demand equation is based on simple quantity theory framework (See Appendix B). Therefore, the rate of inflation simply equals to the rate of growth of the nominal money supply.

Formally speaking, government optimally selects its policies by minimizing the loss function subject to the budget constraint and the output supply function and with respect to π, τ and g. Equilibrium values of inflation, the tax rate, public spending and output are as follows (see Appendix C for the derivations of (3.4)-(3.7))

$$\pi_t = \frac{2\delta_2}{\delta_1} \Psi[\frac{1}{\alpha} \overline{x}_t + \overline{g}_t]$$
(3.4)

$$\tau_t = \frac{\delta_2}{\alpha^2} \Psi \overline{g}_t - \mathsf{Z} \frac{1}{\alpha} \overline{x}_t \tag{3.5}$$

$$g_t = \Psi[\phi \overline{g}_t - \frac{1}{\alpha} \overline{x}_t] \tag{3.6}$$

$$x_t = \mathbf{Z} \,\overline{x}_t - \frac{\delta_2}{\alpha} \Psi \overline{g}_t \tag{3.7}$$

where $\phi = \frac{\delta_2}{\alpha^2} + \frac{2\delta_2}{\delta_1}, \Psi = \frac{1}{(1+\phi)}, \mathsf{Z} = (1 - \frac{\delta_2}{\alpha^2}\Psi) > 0.$

As it is evident from Equation (3.4) there are two sources of the nonzero equilibrium inflation rate. In other words, inflation bias exists due to the presence of non-zero output and public spending targets; \overline{x} and \overline{g} , respectively. Therefore, a rise in \overline{x} and/or \overline{g} raises equilibrium inflation. Similarly, as it is clear from Equation (3.5) the equilibrium tax rate is determined by \overline{x} and \overline{g} . An increase in \overline{g} raises both inflation and taxes since they represent the two alternative methods of financing a higher level of public spending. On the other hand, while a rise in \overline{x} raises equilibrium inflation rate, it lowers tax rates, as expected. Moreover, it is evident from Equation (3.6) and (3.7), while a rise in \overline{g} raises equilibrium public spending it lowers output. Similarly, while a rise in \overline{x} raises equilibrium output it lowers public spending. Finally, in this section, the deviations of equilibrium values of output and public spending from their respective target levels (output gap and public spending gap, respectively) and the inflation rate that the government is concerned about will be presented in Table 3.1.

 Table 3.1 Output Gap, Public Spending Gap and Inflation Rate:

 The Benchmark Model

| $(\overline{x}_t - x_t) = \frac{\delta_2}{\alpha} \Psi[\frac{1}{\alpha} \overline{x}_t + \overline{g}_t]$ |
|---|
| $(\overline{g}_t - g_t) = \Psi[rac{1}{lpha}\overline{x}_t + \overline{g}_t]$ |
| $\pi_t = rac{2\delta_2}{\delta_1} \Psi[rac{1}{lpha} \overline{x}_t + \overline{g}_t]$ |

Table 3.1 indicates that the equilibrium values of output and public spending are lower than their respective target values. Similarly, equilibrium inflation rate is above its respective target level.

There is a trade-off between achieving higher output and public spending. This is clear from Equation (3.6) and (3.7), the higher the public spending (output) target, the lower is the equilibrium output (public spending) and therefore the larger is its deviation from target. This trade-off arises due to the financing requirement. Higher government expenditure is financed by raising taxes and/or inflation. It follows from Equation (3.5), that the higher the \overline{g} , the higher will be the taxes. This will, in turn, lower output by reducing profitability. As a result, the higher the public expenditure target (\overline{g}) the larger the output and public spending gaps and inflation rate.

3.3 The Basic Dynamic Model: Extending the Benchmark Model with Productive Public Spending

Recall that public spending is assumed to be totally unproductive in the benchmark model analyzed above and hence has no favorable effect on productivity and output either in the current or in the following period. However, in practice, governments make separate decisions regarding how much to spend on different categories of public spending. Furthermore, as discussed before, the decision to spend on productive categories instead of on unproductive but popular categories can have crucially different consequences on productivity and output. Therefore, this section extends the above (static) benchmark model into a simple dynamic, i.e. two-period (T = 2), model by considering the productivity enhancing role of public spending. Hence, the main feature of the basic dynamic model is a distinction between the productive (g^p) and nonproductive public spending (g^{np}). Therefore, the benchmark model is modified as follows.

3.3.1 Model

Output

In this model, the representative competitive firm faces the following form of the above given production function (see Section 3.2.1): $Y_t = A_t N_t^{\gamma}$, (0 < $\gamma < 1$), where A_t represents the level of productivity in period t and is assumed to be enhanced by the previous period's productive public spending. Appendix D derives the following normalized output supply function from the representative competitive firm's profit maximization problem as above,

$$x_t = \alpha (\pi_t + \rho g_{t-1}^p - \pi_t^e - \tau_t)$$
(3.8)

where ρ may be thought as productivity coefficient measuring extent by which one period's productive public spending improves the productivity (and hence output) in the following period.^{15,16} All other variables are as defined before.

Preferences and the Budget Constraint of the Policy Maker

With the analytical distinction between productive (g^p) and unproductive public spending (g^{np}) , the policy maker's preferences can be represented by the following loss function

$$L_t^G = \frac{1}{2} \sum_{t=1}^{\infty} \beta_G^{t-1} [\delta_1 \pi_t^2 + (x_t - \overline{x}_t)^2 + \delta_2 (g_t^{np} - \overline{g}_t^{np})^2 + \delta_3 (g_t^p - \overline{g}_t^p)^2]$$
(3.9)

where \overline{g}_t^p and \overline{g}_t^{np} are used as the policy maker's target for productive and non-productive public spending, respectively.¹⁷ All other variables are as defined before.

 $^{^{15}}$ This is in line with most of the literature (e.g. Rogoff, 1990; Dur *et al.*, 1998; and Persson and Tabellini, 2000). See Section 2.3.2.

¹⁶Note that $\rho = \frac{\zeta}{\gamma}$, where ζ is the coefficient of productivity measuring extent by which one period's productive public spending improves the (log) productivity in the following period and γ is a parameter of production function (see Appendix D for more detail).

¹⁷Nevertheless, as the beneficial effects of productive public spending are not usually realized until future periods this spending can be visible in the future and may not yield instant (contemporaneous) utility to the policy maker, and hence may not form part of his current utility function. On the contrary, non-productive spending can be immediately observed by voters and hence increases the popularity of the incumbent government (or the policy maker). Thus, non-productive spending may yield instant utility to the policy maker. These arguments suggest that the loss function may take the following form,

Similarly, the budget constraint of the government can be simply modified as follows

$$g_t^{np} + g_t^p = \pi_t + \tau_t \tag{3.10}$$

This modified budget constraint suggests that distortionary taxes and seigniorage are two sources of financing for the government outlays. Note that a balanced budget rule is assumed in each and every period; that is, borrowing is excluded as a source of finance to abstract from issues of debt dynamics (Chapter 5 will relax this assumption). Thus, the only intertemporal link in this set-up is due to the favorable effect of productive spending on output in the next period.

3.3.2 Equilibrium Macroeconomic Outcomes

Characterization of Equilibrium

In this two-period set-up, equilibrium outcomes are derived by backwards induction. More specifically, policy outcomes in the final-period (t = 2) are derived first, for a given level of g_1^p , and then, equilibrium outcomes in the first-period (t = 1) are derived.

In the final-period, g^p is not among the choice variables in this two-period set-up since the principal benefit of g^p is realized with one-period lag. Accordingly, the vital decision concerning the composition of the public spending

$$L_t^G = \frac{1}{2} \sum_{t=1}^{R=2} \beta_G^{t-1} [\delta_1 \pi_t^2 + (x_t - \overline{x}_t)^2 + \delta_2 (g_t^{np} - \overline{g}_t^{np})^2]$$

Nevertheless, this loss function is a special case ($\delta_3 = 0$) of Equation (3.9) and qualitative nature of the results of this chapter would not change if we employ the above equation instead of Equation (3.9) (see Ismihan and Ozkan, 2002).

is made in the first-period, which will be analyzed below. Therefore, in the final-period, the central policy maker chooses π_2, τ_2 and g_2^{np} subject to the constraints, for a given level of g_1^p . Table 3.2 contains the final-period optimal policy outcomes, for a given level of g_1^p (see Appendix E for the technical details on the derivation of the result for t = 2).

Table 3.2 Final-period Optimal Policy Outcomes:

 $\begin{array}{l} \pi_2 = \frac{2\delta_2}{\delta_1} \Psi[\frac{1}{\alpha} \overline{x}_2 + \overline{g}_2^{np} - \rho g_1^p] \\ x_2 = \mathsf{Z} \, \overline{x}_2 - \frac{\delta_2}{\alpha} \Psi \overline{g}_2^{np} + \frac{\delta_2}{\alpha} \Psi \rho g_1^p \\ g_2^{np} = \Psi[\phi \overline{g}_2^{np} + \rho g_1^p - \frac{1}{\alpha} \overline{x}_2] \\ \tau_2 = \rho \mathsf{Z} \, g_1^p + \frac{\delta_2}{\alpha^2} \Psi \overline{g}_2^{np} - \mathsf{Z} \, \frac{1}{\alpha} \overline{x}_2 \end{array}$

Note:
$$\phi = \frac{\delta_2}{\alpha^2} + \frac{2\delta_2}{\delta_1}, \Psi = \frac{1}{(1+\phi)}, \mathsf{Z} = (1 - \frac{\delta_2}{\alpha^2}\Psi) > 0.$$

Table 3.3 Equilibrium Macroeconomic Outcomes in
$$t = 1$$
 and $t = 2$:
The Basic Dynamic Model

$$\begin{split} g_1^p &= \Theta[\frac{\delta_3}{\delta_2\Psi}\overline{g}_1^p - \overline{g}_1^{np} + \Gamma\overline{g}_2^{np} - \frac{1}{\alpha}\overline{x}_1 + \frac{\Gamma}{\alpha}\overline{x}_2] \\ g_1^{np} &= -\frac{\delta_3}{\delta_2}\Theta\overline{g}_1^p + (1-\Phi)\,\overline{g}_1^{np} - \Lambda\Theta\overline{g}_2^{np} - \frac{1}{\alpha}\Phi\overline{x}_1 - \Lambda\Theta\frac{1}{\alpha}\overline{x}_2 \\ \pi_1 &= \frac{2\delta_2}{\delta_1}[\frac{\delta_3}{\delta_2}\Theta\overline{g}_1^p + \Phi\overline{g}_1^{np} + \Lambda\Theta\overline{g}_2^{np} + \Phi\frac{1}{\alpha}\overline{x}_1 + \Lambda\Theta\frac{1}{\alpha}\overline{x}_2] \\ x_1 &= -\frac{\delta_2}{\alpha}[\frac{\delta_3}{\delta_2}\Theta\overline{g}_1^p + \Phi\overline{g}_1^{np} + \Lambda\Theta\overline{g}_2^{np} + \Lambda\Theta\frac{1}{\alpha}\overline{x}_2] + \Upsilon\overline{x}_1 \\ \tau_1 &= \frac{\delta_2}{\alpha^2}[\frac{\delta_3}{\delta_2}\Theta\overline{g}_1^p + \Phi\overline{g}_1^{np} + \Lambda\Theta\overline{g}_2^{np} + \Lambda\Theta\frac{1}{\alpha}\overline{x}_2] - \Upsilon\frac{1}{\alpha}\overline{x}_1 \\ g_2^{np} &= \Psi(\phi + \rho\Gamma\Theta)\overline{g}_2^{np} - \frac{1}{\alpha}\Psi\Xi\overline{x}_2 + \rho\Psi[\frac{\delta_3}{\delta_2\Psi}\Theta\overline{g}_1^p - \Theta\overline{g}_1^{np} - \Theta\frac{1}{\alpha}\overline{x}_1] \\ \pi_2 &= \frac{2\delta_2}{\delta_1}\Psi\Xi[\frac{1}{\alpha}\overline{x}_2 + \overline{g}_2^{np}] - \rho\frac{2\delta_2}{\delta_1}\Psi[\frac{\delta_3}{\delta_2\Psi}\Theta\overline{g}_1^p - \Theta\overline{g}_1^{np} - \Theta\frac{1}{\alpha}\overline{x}_1] \\ x_2 &= (\mathbb{Z} + \frac{\delta_2}{\alpha^2}\Psi\rho\Gamma\Theta)\overline{x}_2 - \frac{\delta_2}{\alpha}\Psi\Xi\overline{g}_2^{np} + \frac{\delta_2}{\alpha}\Psi\rho[\frac{\delta_3}{\delta_2\Psi}\Theta\overline{g}_1^p - \Theta\overline{g}_1^{np} - \Theta\frac{1}{\alpha}\overline{x}_1] \\ \tau_2 &= (\frac{\delta_2}{\alpha^2}\Psi + \rho\Gamma\Theta\mathbb{Z})\overline{g}_2^{np} - \mathbb{Z}\Xi\frac{1}{\alpha}\overline{x}_2 + \rho\mathbb{Z}[\frac{\delta_3}{\delta_2\Psi}\Theta\overline{g}_1^p - \Theta\overline{g}_1^{np} - \Theta\frac{1}{\alpha}\overline{x}_1] \end{split}$$

$$\begin{split} Note: \ \phi &= \frac{\delta_2}{\alpha^2} + \frac{2\delta_2}{\delta_1}, \Psi = \frac{1}{(1+\phi)}, \mathsf{Z} = (1 - \frac{\delta_2}{\alpha^2}\Psi) > 0, D = \frac{2\delta_2}{\delta_1}\Psi^2 + \Psi, \Lambda = \\ \rho\beta_G D, \Gamma &= \frac{\Lambda}{\Psi} = \frac{\rho\beta_G}{\Psi}D, \Omega = \frac{(\frac{\delta_3}{\delta_2} + \rho\Lambda)}{\Psi}, \Theta = \frac{1}{(1+\Omega)}, 0 < \Phi = \frac{\Psi\Omega}{(1+\Omega)} < 1, \Xi = \\ 1 - \rho\Theta\Gamma > 0, \Upsilon = \stackrel{\mathsf{i}}{1} - \frac{\delta_2}{\alpha^2}\Phi > 0. \end{split}$$

The Basic Dynamic Model

As mentioned before, the decision regarding the composition of public spending is made by policy maker in the first period. Therefore, the policy maker makes his choice by distributing distortions among both intratemporal and intertemporal instruments in t = 1. Formally speaking, the central policy maker chooses π_1, τ_1, g_1^{np} and g_1^p subject to the constraints in the first period. Table 3.3 contains the equilibrium outcomes in t = 1 as well as in t = 2 (see Appendix E for the technical details on the derivation of the result for t = 1).

Favorable Effects of Productive Public Spending on Future Macroeconomic Performance

It could be useful to compare the above results with the results in the static benchmark case. To this end, Table 3.4 is formed below, which shows the output gap, public spending gap and inflation rate in the second period, in line with Table 3.1 of the benchmark case.

Table 3.4 Output Gap, Public Spending Gap and Inflation Rate in t = 2: The Basic Dynamic Model

| $(\overline{x}_2 - x_2) = \frac{\delta_2}{\alpha} \Psi[\frac{1}{\alpha} \overline{x}_2 + \overline{g}_2^{np} - \rho g_1^p]$ |
|---|
| $(\overline{g}_2^{np} - g_2^{np}) = \Psi[\frac{1}{lpha}\overline{x}_2 + \overline{g}_2^{np} - ho g_1^p]$ |
| $\pi_2 = rac{2\delta_2}{\delta_1} \Psi[rac{1}{lpha} \overline{x}_2 + \overline{g}_2^{np} - ho g_1^p]$ |

As it is clear from Table 3.4, the beneficial effect of the previous period's productive public spending on the current period's output clearly mitigates the trade-off between public spending and output; thus, lowers the distortions in the economy. Nevertheless, even though the intratemporal trade-off mentioned in the static benchmark case still remains, higher productive public spending in the previous period now raises the next period's equilibrium output (and hence

the tax base).¹⁸ Likewise, while higher \overline{g}_2 and \overline{x}_2 enhances both the output and unproductive public spending gaps, higher g_1^p helps to reduce them via the intertemporal link.

The interesting result is that the beneficial effects of productive public spending are not limited to output and inflation but also include future non-productive spending.¹⁹ In other words, policy maker could expand his future resources by spending today on productive activities such as core infrastructure, R&D, and education, and, in turn, this would allow the policy maker to increase future non-productive or popular public spending.

Proposition 1 formalizes the above arguments.

Proposition 1 The higher the productive public spending in the first period the lower the inflation (and inflation bias), non-productive public spending gap and output gap; hence, the better the macroeconomic performance in the final period. That is, the higher the g_1^p , the lower the π_2 , $(\overline{g}_2^{np} - g_2^{np})$ and $(\overline{x}_2 - x_2)$.

Proof. The derivative of π_2 with respect to g_1^p is $\frac{-2\delta_2}{\delta_1}\rho\Psi$, which is unambiguously negative for all values of ρ and Ψ . Similarly, the derivative of $(\overline{g}_2^{np} - g_2^{np})$ with respect to g_1^p is $-\rho\Psi$, which is again negative. The derivative of $(\overline{x}_2 - x_2)$ with respect to g_1^p is $-\rho\Psi\frac{\delta_2}{\alpha}$, which is also unambiguously negative.

As is clear from Proposition 1, the higher the size of the productivity coefficient ρ the higher the size of the beneficial effect of productive spending

¹⁸Also note that higher productive public spending committed in the previous period raises the next period's equilibrium tax rate by enhancing the tax base (see Table 3.3). This is the indirect beneficial effects of higher productive public spending. This result is in line with the result obtained from Persson and Tabellini's (2000) model on public investment and economic growth, which is discussed in Section 2.3.

¹⁹It should be noted that the results of this chapter are derived under the absence of electoral uncertainty; therefore, these results and associated conclusions are conditional on this "implicit" assumption that the incumbent government will hold the office in the second period (i.e. there is electoral certainty). This assumption will be relaxed in the following chapters.

on the next period's macroeconomic performance. The determinants of ρ will be discussed in the next chapter.

Productive vs. Non-Productive Spending: Trade-offs and Asymmetries

Table 3.5 provides the comparative statics, which will be utilized in analyzing the trade-offs and associated asymmetries arising from the productivity enhancing role of productive public spending and the existence of budget constraint.

| | $\uparrow \overline{g}_1^p$ | $\uparrow \overline{g}_1^{np}$ | $\uparrow \overline{g}_2^{np}$ | $\uparrow \overline{x}_1$ | $\uparrow \overline{x}_2$ |
|-------------|-----------------------------|--------------------------------|--------------------------------|---------------------------|---------------------------|
| g_1^p | + | _ | + | _ | + |
| g_1^{np} | _ | + | _ | _ | _ |
| π_1 | + | + | + | + | + |
| x_1 | — | _ | _ | + | _ |
| $\tau_{_1}$ | + | + | + | — | + |
| g_2^{np} | + | _ | + | — | _ |
| π_2 | _ | + | + | + | + |
| x_2 | + | _ | _ | _ | + |
| $	au_2$ | + | _ | + | _ | _ |

 Table 3.5 Comparative Statics: The Basic Dynamic Model

Note: + indicates positive effect and - indicates negative effect.

As mentioned before, by spending on productive activities in the current period, the policy maker increases his future resources via the intertemporal link between g_1^p and x_2 ; hence, the policy maker could increase non-productive spending in the next period. However, as can be seen from Table 3.5, there is an intratemporal trade-off between productive and non-productive spending

in the first-period; that is, the higher the productive spending target the lower the non-productive public spending and vice versa. This trade-off emerges due to the existence of budget $constraint^{20}$ and the trade-off between public spending (productive as well as non-productive spending) and output in the first-period, as mentioned in benchmark case. Thus the existence of the above mentioned *intertemporal* link and the *intratemporal* trade-offs results in interesting asymmetries. For example, there is an asymmetry with respect to the effects of productive vs. non-productive spending targets on future output, public spending and inflation, as is seen from Table 3.5. Furthermore, there is another asymmetry between the effects of current and future non-productive public spending targets on current actual productive and non-productive public spending. As can be seen from Table 3.5, a rise in \overline{g}_1^{np} decreases (raises) productive (non-productive) public spending in t = 1 while a rise in \overline{g}_2^{np} raises (lowers) it. This asymmetry is due to the above mentioned trade-off between \overline{g}_1^{np} and \overline{g}_1^p and the intertemporal link between g_1^p and x_2 . That is, on the one hand, a rise in productive spending is only possible by lowering non-productive spending in t = 1 and vice versa; on the other hand, a rise in non-productive spending in t = 2 is only possible by raising productive spending in t = 1. Similarly, while there exists an additional asymmetry between the effects of future output target on productive and non-productive public spending in t = 1, there is not an asymmetry between the effects of current output target on productive and non-productive public spending in t = 1.

The key results are summarized as follows:

• The higher the productive (non-productive) public spending target the higher the actual productive (non-productive) public spending and hence

$$g_t^{np} = \pi_t + \tau_t - g$$

 $^{^{20}}$ The budget constraint of the government [Equation (3.11)] can be re-written as follows

As is clear from this equation, a rise in productive spending lowers non-productive spending and *vice versa*.

the lower (higher) the share of non-productive spending in total public spending in the first period. As a result, the lower (higher) the inflation and the higher (lower) the non-productive public spending and output; hence, the better (worse) the macroeconomic performance in the final period. That is, the higher the \overline{g}_1^p (\overline{g}_1^{np}) the lower (higher) the π_2 and the higher (lower) g_2^{np} and x_2 .

• The higher are non-productive spending target and output target in future, the lower (higher) must be the productive (non-productive) public spending and hence the lower must be the share of non-productive spending in total public spending today. That is, the higher are \overline{g}_2^{np} and \overline{x}_2 the lower is the g_1^{np} (g_1^p).

Therefore, there exist both *intra*temporal and *inter*temporal trade-offs of policy making and associated asymmetries affecting the composition of public spending in the basic dynamic macroeconomic policy making framework. Next chapter will discuss the political economy of the composition of public spending and this will shed some light on the above results.

Finally, given the above results on the macroeconomic effects of productive vs. non-productive public spending, it is interesting to analyze the macroeconomic consequences of the policy maker's public spending decisions for the whole period (i.e. first and final periods taken together).

For instance, even though there is not any asymmetry with respect to the effects of productive vs. non-productive spending targets on *current* inflation, the size of the effect of productive public spending target is lower *vis-a-vis* non-productive spending targets in t = 1 (i.e. $\partial \pi_1 / \partial \overline{g}_1^{np} > \partial \pi_1 / \partial \overline{g}_1^p > 0$). Therefore, recalling that there is an asymmetry with respect to the effects of productive vs. non-productive spending targets on *future* inflation (i.e. $\partial \pi_2 / \partial \overline{g}_1^{np} > 0$ and $\partial \pi_2 / \partial \overline{g}_1^p < 0$), productive public spending produces lower

inflation, compared to non-productive public spending, when the whole period is considered.

Another interesting as well as related result is that transferring resources from non-productive public spending to productive spending (via raising productive spending target) lowers *current* non-productive spending but it may raise *future* non-productive spending by larger amount than the lost nonproductive public spending in the current period, depending on the size of the productivity coefficient ρ . More formally, if ρ is larger than one then the lost non-productive public spending in the first period $(|\partial g_1^{np}/\partial \overline{g}_1^p|)$ is lower than the increment in non-productive spending in the final period $(\partial g_2^{np}/\partial \overline{g}_1^p)$ and vice versa, if ρ is lower than one. Similarly, if ρ is larger than one then the reduction in output in the current period $(|\partial x_1/\partial \overline{g}_1^p|)$ is lower than the increment in output in the final period $(\partial x_2/\partial \overline{g}_1^p)$ and vice versa, if ρ is lower than one.

3.4 Decentralized Policy Making

In this section, the previous analysis is extended by considering decentralized monetary and fiscal policy making. In other words, we consider a policy making framework such that government acting through the fiscal authority performs the fiscal policy and an independent central bank (monetary authority) performs the monetary policy.

3.4.1 The Decentralized Benchmark Model

This section extends the static centralized policy making framework of Section 3.2 into a decentralized policy making framework.²¹ In this new set-up,

²¹See, for example, Alesina and Tabellini (1987), Jensen (1994), Debelle and Fischer (1994), Beetsma and Bovenberg (1997a, 1997b, 1999) and Ozkan (1998, 2000) for similar variants of the decentralized benchmark model.
government decides about taxes and spending while the central bank chooses the inflation rate. Thus, the only but crucial difference in this set-up is that each authority has its own preferences and policy decisions are taken simultaneously and non-cooperatively. Therefore, while preferences of the government (G) is the same as Equation (3.2), monetary authority's (M) preferences can be summarized by the following loss function,

$$L_t^M = \frac{1}{2} \underbrace{\times}_{t=1}^{M} \beta_M^{t-1} [\mu_1 \pi_t^2 + (x_t - \overline{x}_t)^2 + \mu_2 (g_t - \overline{g}_t)^2]$$
(3.11)

where L_t^M denotes the welfare losses incurred by the independent central bank, μ_1 and μ_2 denote, respectively, the central bank's relative dislike for the deviations of inflation (π) and public spending (g) from their target levels ($\overline{\pi}$ and \overline{g}),²² and μ_1 is assumed to be greater than δ_1 . Similarly, β_M is the central bank's discount factor and it is assumed to be greater than β_G . That is, the independent central bank is more conservative than elected government ($\mu_1 > \delta_1$) and does not discount the future at a lower rate than the elected government ($\beta_M > \beta_G$).

Output supply function and the budget constraint of the government are the same as in the benchmark case of Section 3.2. That is, they are represented by Equation (3.1) and (3.3), respectively.

As the policy decisions are taken simultaneously and non-cooperatively in this one-period model, government and independent central bank plays a one-shot Nash game. In other words, while the government decides about taxes and spending, taking central bank's action and expectations as given, the central bank chooses the inflation rate, taking the government's action and expectations as given.

²²Again, inflation target $(\overline{\pi})$ is assumed to be zero for simplicity.

Nash equilibrium values of inflation rate, tax rate, public spending and output are contained in Table 3.6, where superscript d denotes the decentralized case (see Appendix F for the derivation of equilibrium values)

Table 3.6 Equilibrium Macroeconomic Outcomes: Decentralized Benchmark Case

| $\pi^d_t = rac{\delta_2}{\mu_1} \Psi'[rac{1}{lpha} \overline{x}_t + \overline{g}_t]$ |
|--|
| $x_t^d = Z'\overline{x}_t - rac{\delta_2}{lpha}\Psi'\overline{g}_t$ |
| $g_t^d = \Psi'[\phi'\overline{g}_t - rac{1}{lpha}\overline{x}_t]$ |
| $\tau^d_t = \frac{\delta_2}{\alpha^2} \Psi' \overline{g}_t - Z' \frac{1}{\alpha} \overline{x}_t$ |
| , u , u |

Note: $\phi' = \frac{\delta_2}{\alpha^2} + \frac{\delta_2}{\mu_1}, \Psi' = \frac{1}{(1+\phi')}, \mathsf{Z}' = 1 - \frac{\delta_2}{\alpha^2} \Psi' > 0.$

It is clear that these results are similar to the those of the centralized case (Section 3.2). Hence they could be interpreted in the same way. However, the crucial difference between the decentralized and centralized policy making is that the equilibrium values of output and inflation are lower under decentralized policy making. Lower value of equilibrium inflation is due to the fact that the independent central bank is more conservative than the elected government ($\mu_1 > \delta_1$).^{23,24} This result is in line with the well-known argument in the literature of central bank independence that the delegation of monetary policy making powers to independent central banks leads to a lower inflation (see, for example, Rogoff, 1985).

Similarly, the lower level of equilibrium output under decentralized policy making is due to the detrimental effects of higher taxes on output. That is, lower level of inflation involves higher resources elsewhere to finance public

²³Provided that $\mu_1 > \delta_1$, then $\frac{\delta_2}{\mu_1} \Psi' < \frac{2\delta_2}{\delta_1} \Psi$ and thus equilibrium level of inflation is lower under decentralized policy making compared to the centralized policy making.

²⁴Also note that central bank does not internalize the budget constraint of the government.

spending, which results in higher equilibrium taxes and hence a lower equilibrium level of output, given the detrimental effects of taxes on output in this model.

3.4.2 The Decentralized Dynamic Model

In this section, the basic dynamic model of Section 3.3 is extended to a decentralized policy making framework. In this new two-period framework, government and independent central bank play a Nash game in both periods. The only change in this new set-up is as set-out above. That is, while preferences of the government is the same as Equation (3.9), central bank's preferences can be summarized by the Equation (3.11). Similarly, output supply function and the budget constraint of the government are represented by Equation (3.8) and (3.10), respectively.

As in Section 3.3, equilibrium outcomes are derived by backwards induction. Table 3.7 contains the equilibrium outcomes in t = 1 as well as in t = 2for the dynamic decentralized model.²⁵

As it is clear from Table 3.7, main findings of Section 3.3 also hold for the decentralized case. For example, the higher the productive (non-productive) public spending in the first period the lower (higher) the inflation (and inflation bias) and the higher (lower) non-productive public spending and output in the final period. Similarly, the higher the non-productive spending and output targets in future, the lower (higher) must be the productive (unproductive) public spending today.

²⁵Equilibrium results are derived by backwards induction as in Appendix E. That is, for a given g_1^p , policy outcomes and fiscal authority's welfare losses for t = 2 are derived first. Then, equilibrium outcomes for t = 1 are derived.

Also note that government and independent central bank play a Nash game as in Appendix F in both periods (i.e. in t = 1 and t = 2). For example, central bank chooses π_2 to minimize Equation (3.11) while the government chooses τ_2 and g_2^{np} to minimize Equation (3.9) subject to the constraints, simultaneously and non-cooperatively (i.e. by taking each other's action and expectations as given).

Table 3.7 Equilibrium Macroeconomic Outcomes

| III $t = 1$ and $t = 2$; (Dynamic) Decembranized Ca | in t | t = 1 a | and $t =$ | 2: (I | Dynamic) | Decentra | alized | Cas |
|--|--------|----------|-----------|-------|------------------|----------|--------|-----|
|--|--------|----------|-----------|-------|------------------|----------|--------|-----|

| $g_1^{p,d} = \Theta'[\frac{\delta_3}{\delta_2 \Psi'}\overline{g}_1^p - \overline{g}_1^{np} + \Gamma'\overline{g}_2^{np} - \frac{1}{\alpha}\overline{x}_1 + \frac{1}{\alpha}\Gamma'\overline{x}_2]$ |
|--|
| $g_1^{np,d} = -\frac{\delta_3}{\delta_2}\Theta'\overline{g}_1^p + (1-\Phi')\overline{g}_1^{np} - \Lambda'\Theta'\overline{g}_2^{np} - \frac{1}{\alpha}\Phi'\overline{x}_1 - \Lambda'\Theta'\frac{1}{\alpha}\overline{x}_2$ |
| $\pi_1^d = \frac{\delta_2}{\mu_1} [\frac{\delta_3}{\delta_2} \Theta' \overline{g}_1^p + \Phi' \overline{g}_1^{np} + \Lambda' \Theta' \overline{g}_2^{np} + \Phi' \frac{1}{\alpha} \overline{x}_1 + \Lambda' \Theta' \frac{1}{\alpha} \overline{x}_2]$ |
| $x_1^d = -\frac{\delta_2}{\alpha} [\frac{\delta_3}{\delta_2} \Theta' \overline{g}_1^p + \Phi' \overline{g}_1^{np} + \Lambda' \Theta' \overline{g}_2^{np} + \Lambda' \Theta' \frac{1}{\alpha} \overline{x}_2] + \Upsilon' \overline{x}_1$ |
| $\tau_1^d = \frac{\delta_2}{\alpha^2} [\frac{\delta_3}{\delta_2} \Theta' \overline{g}_1^p + \Phi' \overline{g}_1^{np} + \Lambda' \Theta' \overline{g}_2^{np} + \Lambda' \Theta' \frac{1}{\alpha} \overline{x}_2] - \Upsilon' \frac{1}{\alpha} \overline{x}_1$ |
| $g_2^{np,d} = \Psi'[\phi'\overline{g}_2^{np} + ho g_1^{p,d} - rac{1}{lpha}\overline{x}_2]$ |
| $=\Psi'(\phi'+\rho\Gamma'\Theta')\overline{g}_2^{np}-\tfrac{1}{\alpha}\Psi'\Xi'\overline{x}_2+\rho\Psi'[\tfrac{\delta_3}{\delta_2\Psi'}\Theta'\overline{g}_1^p-\Theta'\overline{g}_1^{np}-\Theta'\tfrac{1}{\alpha}\overline{x}_1]$ |
| $\pi_2^d = rac{\delta_2}{\mu_1} \Psi'[rac{1}{lpha} \overline{x}_2 + \overline{g}_2^{np} - ho g_1^{p,d}]$ |
| $= \tfrac{\delta_2}{\mu_1} \Psi' \Xi' [\tfrac{1}{\alpha} \overline{x}_2 + \overline{g}_2^{np}] - \rho \tfrac{\delta_2}{\mu_1} \Psi' [\tfrac{\delta_3}{\delta_2 \Psi'} \Theta' \overline{g}_1^p - \Theta' \overline{g}_1^{np} - \Theta' \tfrac{1}{\alpha} \overline{x}_1]$ |
| $x_2^d = {\sf Z}^{\prime} \overline{x}_2 - rac{\delta_2}{lpha} \Psi^{\prime} \overline{g}_2^{np} + rac{\delta_2}{lpha} \Psi^{\prime} ho g_1^{p,d}$ |
| $= (Z' + \tfrac{\delta_2}{\alpha^2} \Psi' \rho \Gamma' \Theta') \overline{x}_2 - \tfrac{\delta_2}{\alpha} \Psi' \Xi' \overline{g}_2^{np} + \tfrac{\delta_2}{\alpha} \Psi' \rho [\tfrac{\delta_3}{\delta_2 \Psi'} \Theta' \overline{g}_1^p - \Theta' \overline{g}_1^{np} - \Theta' \tfrac{1}{\alpha} \overline{x}_1]$ |
| $	au_2^d = ho Z' g_1^{p,d} + rac{\delta_2}{lpha^2} \Psi' \overline{g}_2^{np} - Z' rac{1}{lpha} \overline{x}_2$ |
| $= (\frac{\delta_2}{\alpha^2} \Psi' + \rho \Gamma' \Theta' Z') \overline{g}_2^{np} - Z' \Xi' \frac{1}{\alpha} \overline{x}_2 + \rho Z' [\frac{\delta_3}{\delta_2 \Psi'} \Theta' \overline{g}_1^p - \Theta' \overline{g}_1^{np} - \Theta' \frac{1}{\alpha} \overline{x}_1]$ |

$$\begin{split} Note: \ \phi' &= \frac{\delta_2}{\alpha^2} + \frac{\delta_2}{\mu_1}, \Psi' = 1/(1+\phi'), \mathsf{Z}' = 1 - \frac{\delta_2}{\alpha^2} \Psi', D' = \frac{\alpha^2 \delta_1 \delta_2 + \delta_2 \mu_1^2 + \alpha^2 \mu_1^2}{\alpha^2 \mu_1^2} \Psi'^2, \\ \Lambda' &= \rho \beta_G D', \Gamma' = \frac{\Lambda'}{\Psi'} = \frac{\rho \beta_G}{\Psi'} D', \Omega' = \frac{(\frac{\delta_3}{\delta_2} + \rho \Lambda')}{\Psi'}, \Theta' = \frac{1}{(1+\Omega')}, 0 < \Phi' = \frac{\Psi' \Omega'}{(1+\Omega')} < 1, \Xi' = 1 - \rho \Theta' \Gamma' > 0, \Upsilon' = \frac{\mathsf{i}}{1 - \frac{\delta_2}{\alpha^2} \Phi'} > 0. \end{split}$$

It is clear that in the static decentralized benchmark case, where all public spending is unproductive, central bank independence is an institutional solution for lowering the inflation bias. However, this may not be the case in the dynamic decentralized model given the beneficial effects of current productivity-enhancing public spending on the next period's macroeconomic performance²⁶

²⁶The size of the beneficial effect of productive public spending is expected to be high for developing countries since the productivity of public investment (ρ) is expected to be high for them (see, for example, World Bank, 1994 and Azariadis and Lahiri, 2002).

as well as on the distortions in the economy (e.g. inflation bias).²⁷ That is, central bank independence by leading to lower inflation diminishes the available resources for public spending (by lowering seigniorage revenue) and hence results in a fall in productive spending in the first period²⁸ and, as a result, it may have unfavorable effects on future inflation. Therefore, central bank independence may not result in lower level of equilibrium inflation when the whole period is considered, i.e. first and final periods taken together.

To achieve a more credible monetary policy and to reduce the political manipulation of inflation and the inflation bias, many developing countries, including Turkey, as well as developed countries granted high degree of independence to their central banks during the last fifteen years.²⁹ Nevertheless, recent experiences of developing countries have shown that the credibility of monetary policy does not only depend on the independence of the monetary authority but also crucially depends on the overall stance of macroeconomic policy (see, for example, Agenor and Montiel, 1996). For example, credibility cannot be achieved if fiscal policy is not sustainable and/or consistent with the monetary policy, even in the case of fully-independent central bank. The results of this section also suggest that it is important to take into account the other dynamics of fiscal policy, such as the beneficial effects of productivity-enhancing public spending on future macroeconomic performance, in designing optimal macroeconomic policy making framework.

 $^{^{27}\}mathrm{Also}$ recall from the previous analysis that productive public spending produces lower inflation, compared to non-productive public spending, when the whole period is considered.

²⁸Moreover, as discussed previously, lower level of inflation also involves higher resources elsewhere to finance public spending, which results in higher equilibrium taxes and hence a lower equilibrium level of output due to the detrimental effects of taxes on output.

²⁹See Kirshner (2001), Romer (2001) and Agenor and Montiel (1996) for the literature on central bank independence and on other related topics such as inflation targeting.

3.5 Conclusion

This chapter has attempted to study how the government's public spending decisions affect overall macroeconomic performance. To this end, a macroeconomic policy making framework is developed by linking the overall macroeconomic performance of an economy to the public spending decisions. This framework, in turn, has enabled us to analyze the consequences of the two types of public spending (productive vs. non-productive public spending) on macroeconomic performance.

The main result of this chapter is that a change in the composition of public spending can play a crucial role in future macroeconomic performance. For instance, it has been shown that if public resources are channelled into productive public spending, such as spending on the core infrastructure, R&D, and education, the macroeconomic performance will be improved in the future; and vice versa, if public resources are channelled to non-productive but popularity enhancing public spending, such as spending on public wage increases and social transfers. This is due to the beneficial effect of productive public spending on the next period's output and hence on the distortions in the economy. The interesting result is that the beneficial effects of productive spending are not only limited to future output and inflation but also includes future non-productive spending. In other words, policy maker could expand his future resources by spending today on productive activities and, in turn, this would allow the policy maker to increase even future non-productive or popular spending. Additionally, another related and interesting result is that transferring resources from non-productive public spending to productive spending lowers *current* non-productive spending but it can raise *future* non-productive spending by larger amount than the lost non-productive public spending in the current period, if the size of the productivity coefficient ρ is larger than one. Likewise, if ρ is larger than one then the reduction in output in the current period is lower than the increment in output in the next period and vice versa, if ρ is lower than one. Finally, it has been also shown that productive public spending produces lower inflation, compared to non-productive public spending, when the whole period is considered.

The main findings of this chapter also hold under both centralized and decentralized policy making frameworks. However, given the favorable effects of productive public spending on future macroeconomic performance, the delegation of monetary policy making to an independent central bank may not result in lower inflation in the long-term. In many developing countries seigniorage is an important source of finance (see Agenor and Montiel, 1996) and the productivity of public investment is expected to be high (World Bank, 1994); therefore, in such countries central bank independence may harm inflation performance in the long-term. Therefore, it is important to take into account the dynamics of public spending and hence fiscal policy choices, in designing optimal macroeconomic policy making framework.

The main findings in this chapter reveal that policy makers face both *intra*temporal and *inter*temporal trade-offs while making the choice for the composition of overall public spending. Therefore, political economy factors, such as political instability and electoral uncertainty, can play a crucial role on the policy maker's choice. The political economy and related issues will be discussed in the next chapter and this will shed some light on the above results. Moreover, the issues of debt dynamics will be discussed in Chapter 5.

CHAPTER 4

THE POLITICAL ECONOMY OF THE COMPOSITION OF PUBLIC SPENDING AND FISCAL ADJUSTMENT

4.1 Introduction

The previous chapter has developed a macroeconomic policy making framework that enabled us to investigate the macroeconomic consequences of the policy maker's choice for the composition of overall public spending. This chapter attempts to analyze the effects of several politico-economic factors on the composition of public spending and macroeconomic outcomes. In other words, the current chapter aims to extend the previous chapter's analysis by exploring the role of a set of political economy factors, such as political instability and electoral uncertainty, on the policy maker's choice for the composition of overall public spending.

This chapter particularly focuses on the role of socio-political instability on public spending decisions and overall macroeconomic performance.¹ In line

 $^{^{1}}$ See Section 2.3 for an overview of the literature on the role of socio-political factors on public spending policies and macroeconomic performance.

with this aim, the policy makers' choice for one type of public spending over the other is taken to be determined by a number of socio-political factors such as the degree of income inequality, social and ethnic fractionalization, which may affect the level of political instability and hence the public spending decisions of the incumbent governments. Additionally, a high level of political instability may lead to myopic policies (via electoral uncertainty),² in the form of low levels of productive spending. This possibility arises due to the *inter*temporal nature³ of productive public spending that creates an opportunity for a strategic political behavior. Thus, this chapter attempts to provide some political economy explanations to the myopic and populist spending policies and associated undesirable macroeconomic performances of some developing countries with unstable and polarized socio-political environment.⁴

The second issue that is considered in this chapter is the role of qualitative aspects of fiscal policy making on macroeconomic performance. More specifically, this chapter attempts to develop a framework to provide insights into the understanding of recent empirical results on the detrimental effects of corruption and favoritism on the level of productivity of productive public spending, such as public investment in infrastructure, and hence on output performance (see, for example, Mauro, 1997; and Tanzi and Davoodi, 1998).⁵

The third and last issue that is considered in this chapter is related to expansionary fiscal adjustments. The current line of research emphasizes the expansionary consequences of some types of fiscal adjustments (see, for example, Giavazzi and Pagano, 1990; Perotti, 1996; Alesina and Ardagna, 1998; and Alesina *et al.*, 1998).⁶ There is growing empirical evidence that fiscal con-

 $^{^2\}mathrm{Recall}$ that Chapter 3 implicitly assumes electoral certainty. This chapter will relax that assumption.

³Productive public spending committed in the current period can enhance future productivity and output. Thus, productive public spending connects *current* government to *uncertain* future government.

 $^{^4}$ Chapter 5 will analyze the role of political instability and electoral uncertainty on the public borrowing policies and macroeconomic performance.

⁵See Chapter 2 for more detail.

 $^{^{6}}$ See Chapter 2 for more detail.

solidations involving largely public investment cuts are shown to be contractionary, while fiscal adjustments that entail largely current or social transfer expenditure cuts are expansionary. Therefore, this chapter also attempts to provide a political economy explanation for the role of the composition of fiscal adjustments on macroeconomic performance.

The remainder of this chapter is organized as follows. Section 4.2 analyzes the political economy determinants of the policy maker's choice on the composition of public spending and hence on the macroeconomic performance, by utilizing the macroeconomic framework developed in the previous chapter. More specifically, the effects of the socio-political instability and corruption on macroeconomic performance will be investigated in Section 4.2, by focusing on the role of productivity-enhancing public spending. Section 4.3 explores the role of the composition of fiscal adjustments on their consequences for macroeconomic performance and provides a political economy explanation to it. Finally, Section 4.4 concludes the chapter.

4.2 Political Economy of the Composition of Public Spending

To analyze the role of a number of political economy factors on the policy maker's public spending decisions and on macroeconomic performance, this section utilizes the basic dynamic model. In this model, the political structure and factors, such as political instability and electoral uncertainty, may affect the government's⁷ public spending decisions and macroeconomic outcomes in various ways, by affecting: (1) the government's spending targets (\overline{g}^p and \overline{g}^{np}) as well as the weights attached to these targets (δ_2 and δ_3); (2) the

 $^{^{7}}$ This chapter continues to utilize a centralized policy making framework but the main results also hold under a *de*centralized policy making framework.

government's discount factor (β_G) and (3) the coefficient of productivity (ρ). The following sub-sections formally analyze these channels.

4.2.1 Political Instability and Polarization

Political instability and polarization can manifest itself directly or indirectly in the public spending decisions.⁸ Political instability, for instance, may be directly reflected in the public spending decisions (via policy maker's targets) due to the characteristics of the socio-political structure. It may also manifest itself through elections. Therefore, first the effects of the characteristics of the socio-political structure on public spending decisions and hence on macroeconomic performance will be analyzed and then the role of electoral uncertainty on public spending decisions will be investigated in the following two subsections, respectively.

Income Inequality, Social Fractionalization, Weak Governments and Populism

As mentioned in Chapter 2, a number of characteristics of the political environment, such as the existence of weak or strong governments, income and wealth inequality and social fractionalization, may have significant effects on political instability and public spending decisions. Politically weak governments, for instance, tend to cut public investment rather than current spending compared to politically strong governments (Roubini and Sachs, 1989a). Furthermore, a high degree of income and wealth inequality, especially in developing countries, usually give rise to an unstable political environment (Alesina and Perotti, 1996). Governments in such atmosphere have greater incentives to follow

 $^{^8 \}mathrm{See}$ Chapter 2 for more detail.

populist policies which favor redistributive public spending.⁹ Moreover, higher level of social or ethnic fractionalization may also lead to an increase in government consumption spending aimed at lowering "political risk" or "placating opposition" (Easterly and Levine, 1997; and Annett, 2001).

Within the previously developed macroeconomic framework (Chapter 3), it might be argued that all of the above mentioned characteristics of political environment are reflected in the policy maker's targets for productive and non-productive public spending (i.e. in \overline{g}_t^p and \overline{g}_t^{np} , respectively). That is, the higher the degree of income and wealth inequality, social and ethnic fractionalization; the higher the level of political instability and polarization, and the higher (lower) the policy maker's target for the non-productive or popularity-enhancing public spending (productive or productivity-enhancing public spending); hence, the higher the share of non-productive public spending target (s_t^{np}) in total public spending target (\overline{g}_t^T) .¹⁰ The effects of productive and non-productive public spending targets on equilibrium values of productive and unproductive spending have already been shown in the previous chapter. However, the role of political instability on public spending decisions and on consequences for macroeconomic outcomes can be more formally analyzed by replacing \overline{g}_1^{np} and \overline{g}_1^p with $s_1^{np}\overline{g}_1^T$ and $(1-s_1^{np})\overline{g}_1^T$, respectively. Therefore, the equilibrium values of productive and non-productive public spending in t = 1(see Section 3.3) can be re-written as follows,

$$g_1^p = \Theta \frac{\delta_3}{\delta_2 \Psi} \overline{g}_1^T - \Theta (\frac{\delta_3}{\delta_2 \Psi} + 1) s_1^{np} \overline{g}_1^T + \Theta [\Gamma \overline{g}_2^{np} - \frac{1}{\alpha} \overline{x}_1 + \frac{\Gamma}{\alpha} \overline{x}_2]$$
(4.1)

⁹The demand for redistributive public spending is higher the higher is the degree of income and wealth inequality (see, for example, Alesina and Rodrik, 1994; and Benabou, 1996).

¹⁰By definition total public spending target in period t (\overline{g}_t^T) is the sum of productive public spending target (\overline{g}_t^p) and non-productive public spending target (\overline{g}_t^{np}) in that period. Hence, the share of the policy maker's non-productive public spending target in total public spending (in period t) is given by $s_t^{np} = \frac{\overline{g}_t^{np}}{\overline{g}_t^T}$. Therefore, we can re-write the \overline{g}_t^{np} and \overline{g}_t^p , in terms of these new definitions: $\overline{g}_t^{np} = s_t^{np} \overline{g}_t^T$ and $\overline{g}_t^p = (1 - s_t^{np}) \overline{g}_t^T$.

$$g_1^{np} = -\frac{\delta_3}{\delta_2}\Theta \overline{g}_1^T + \frac{\mu}{1 + \frac{\delta_3}{\delta_2}} + \phi \Psi \Omega \Theta S_1^{np} \overline{g}_1^T - [\Lambda \Theta \overline{g}_2^{np} + \frac{1}{\alpha} \Phi \overline{x}_1 + \Lambda \Theta \frac{1}{\alpha} \overline{x}_2]$$
(4.2)

where $\overline{g}_{1}^{np} = s_{1}^{np}\overline{g}_{1}^{T}, \overline{g}_{1}^{p} = (1 - s_{1}^{np})\overline{g}_{1}^{T}, s_{1}^{np} = \frac{\overline{g}_{1}^{np}}{\overline{g}_{1}^{T}}, \overline{g}_{1}^{T} = \overline{g}_{1}^{np} + \overline{g}_{1}^{p}$ and other variables are as defined before (see Section 3.3 for more detail).

The following proposition formalizes the above arguments.

Proposition 2 The higher the political instability and polarization, the higher the share of the policy maker's target for non-productive spending (s_1^{np}) and hence the higher the equilibrium share of non-productive spending in total public spending in the first period. As a result, the worse is the macroeconomic performance in the final period. That is, for a given level of g_1^T , the higher the s_1^{np} the higher (lower) the g_1^{np} (g_1^p) and the higher the $\frac{g_1^{np}}{g_1^{np}+g_1^p}$. In turn, the higher are the ($\overline{x}_2 - x_2$), ($\overline{g}_2^{np} - g_2^{np}$), and π_2 .

Proof. The derivative of g_1^{np} with respect to s_1^{np} is $1 + \frac{\delta_3}{\delta_2} + \phi \Psi \Omega \quad \Theta \overline{g}_1^T$, which is unambiguously positive. The derivative of g_1^p with respect to s_1^{np} is $-\Theta(\frac{\delta_3}{\delta_2\Psi} + 1)\overline{g}_1^T$, and it is unambiguously negative. Therefore, by utilizing Proposition 1 of the previous chapter, it is straight forward to show that $\partial(\overline{x}_2 - x_2)/\partial s_1^{np}, \partial(\overline{g}_2^{np} - g_2^{np})/\partial s_1^{np}$, and $\partial \pi_2/\partial s_1^{np}$ are all positive.

Proposition 2 clearly states that the higher the political instability and polarization, the lower will be the share of productive public spending in total public spending in equilibrium. As a result, the worse will be the macroeconomic performance in the next period. Therefore, this macroeconomic framework provides an alternative possible link between political instability and macroeconomic performance, by focusing on the role of productivity-enhancing or productive public spending. Put it differently, while previous studies have underlined the negative effects of political instability and polarization on (private) investment and hence on output (e.g. Alesina and Perotti, 1996), these results suggest that political instability and polarization may have negative effects on output by *directly* affecting the composition of public spending.

Electoral Uncertainty, Political Instability and the Strategic Behavior

This section analyzes the role of electoral uncertainty on policy maker's public spending decisions. In particular, it focuses on the relation between political instability and the strategic use of productive public spending.

As discussed before, productive public spending is an *intertemporal* policy tool that links the *current* government to *uncertain* future government. While the costs of productive public spending, such as public infrastructure investment, are borne by the *current* government (by spending more on public investment the incumbent spends less on other categories of public expenditure), *uncertain* future government reaps the benefits of productive spending. Therefore, a forthcoming election at which there exist a high probability that the incumbent government may be voted out of office inevitably leads to myopic policy making and strategic political behavior.

Likewise, within the macroeconomic policy making framework developed so far, the low probability of re-election at the end of the current period (due to a high level of political instability) may give rise to a strategic political behavior.¹¹ In other words, if there is a high probability that the incumbent government may not be in the office in the next period to realize the favorable effects of productive public spending committed in the previous period, then the incumbent is more likely to favor non-productive or popularity-enhancing

¹¹See Chapter 2 for more detail on the idea of the strategic use of public investment.

public spending at the expense of productive public spending, which will yield benefits that are visible in the next period.

To explore the role of a forthcoming election on the incumbent government's public spending decisions it is assumed that the elections will take place at the beginning of t = 2. As indicated before, electoral uncertainty affects the rate of time preference (subjective discount factor) of the incumbent government; therefore, the incumbent's *effective* subjective discount factor is equal to $\beta_G^* = p\beta_G$ where p is the incumbent's re-election probability and β_G is assumed to be it's subjective discount factor under the absence of electoral uncertainty (p = 1). Timing of events is as follows. Elections will take place at the end of the first period (after the macroeconomic outcome is realized in that period) but before nominal wages are set in the second period. This implies that optimal policy outcomes, for a given level of g_1^p , in the second period will be the same as of those in Section 3.3. Nevertheless, the high probability of being out of office at the end of the first period implies that the incumbent government may not be in the office in the second and the final period to realize the favorable effects of productive public spending made in the previous period; thus, the incumbent is more likely to favor non-productive public spending at the expense of productive public spending. The resulting equilibrium productive public spending is as follows

$$g_1^{p,E} = \Theta^* \left[\frac{\delta_3}{\delta_2 \Psi} \overline{g}_1^p - \overline{g}_1^{np} + \Gamma^* \overline{g}_2^{np} - \frac{1}{\alpha} \overline{x}_1 + \frac{\Gamma^*}{\alpha} \overline{x}_2 \right]$$
(4.3)

where superscript E denotes equilibrium outcomes under electoral uncertainty and $\Theta^* = \frac{1}{(1+\Omega^*)}, \Omega^* = \frac{(\frac{\delta_3}{\delta_2} + \rho \Lambda^*)}{\Psi}, \Gamma^* = \frac{\Lambda^*}{\Psi} = \frac{\rho \beta_G^*}{\Psi} D, \Lambda^* = \rho \beta_G^* D, \ \beta_G^* = p \beta_G$ and other variables are as defined before (see Appendix G for more detail on the technical details of derivation and equilibrium values of all other variables). Proposition 3 summarizes the role of electoral uncertainty on the equilibrium productive public spending.

Proposition 3 i) If productive public spending does not yield instant utility to the incumbent government ($\delta_3 = 0$), the lower (higher) the incumbent's probability of reelection (p) the lower (higher) the productive public spending in equilibrium. ii) However, if productive public spending yields instant utility to the incumbent government ($\delta_3 > 0$), the lower (higher) the incumbent's probability of reelection (p) the lower (higher) the productive public spending in equilibrium if and only if

$$[(1+\frac{\delta_3}{\delta_2\Psi})(\overline{g}_2^{np}+\frac{1}{\alpha}\overline{x}_2)+\rho(\overline{g}_1^{np}+\frac{1}{\alpha}\overline{x}_1)]>\frac{\delta_3}{\delta_2\Psi}\rho\overline{g}_1^p.$$

Proof. i) Provided that $\delta_3 = 0$, the derivative of $g_1^{p,E}$ with respect to p is $\frac{\Gamma^*}{p} \Theta^{*2}[(\overline{g}_2^{np} + \frac{1}{\alpha}\overline{x}_2) + \rho(\overline{g}_1^{np} + \frac{1}{\alpha}\overline{x}_1)]$. Given that all these parameters are positive this derivative is unambiguously positive.

ii) Provided that $\delta_3 > 0$, the derivative of $g_1^{p,E}$ with respect to p is $\frac{\Gamma^*}{p}\Theta^{*2}[(1+\frac{\delta_3}{\delta_2\Psi})(\overline{g}_2^{np}+\frac{1}{\alpha}\overline{x}_2)+\rho(\overline{g}_1^{np}+\frac{1}{\alpha}\overline{x}_1)-\frac{\delta_3}{\delta_2\Psi}\rho\overline{g}_1^p]$. This derivative is positive if and only if $[(1+\frac{\delta_3}{\delta_2\Psi})(\overline{g}_2^{np}+\frac{1}{\alpha}\overline{x}_2)+\rho(\overline{g}_1^{np}+\frac{1}{\alpha}\overline{x}_1)] > \frac{\delta_3}{\delta_2\Psi}\rho\overline{g}_1^p$.

The above proposition states that electoral uncertainty would certainly lead to a strategic behavior if productive public spending does not provide instant utility to the incumbent government.¹² That is, in this case, the incumbent is more likely to favor non-productive or popular public spending at the expense of productive spending the lower the probability of the incumbent's re-election. However, even if we assume that productive public spending provides instant utility to the incumbent; then, the existence of a high degree of political instability and polarization may also lead to myopic and strategic behavior. In other words, the higher the level of political instability then the higher the s_1^{np}

¹²This assumption seems not be unreasonable since productive spending usually become visible in the future. See Chapter 3 for more detail.

and it is more likely that the incumbent government will use the productive public spending strategically.¹³

Thus, in addition to the direct effect of a high degree of political instability on public spending decisions and associated unfavorable consequences on the overall macroeconomic performance (as discussed previously), a high degree of political instability, by leading to myopic and strategic behavior in the form of low level of productive spending, also has potentially unfavorable consequences on the overall macroeconomic performance.

4.2.2 Quality of Productive Public Spending: Corruption and Favoritism

As mentioned in the previous chapter, the size of the beneficial effect of productive spending positively depends on the size of the coefficient of productivity ρ . The level of ρ is related to, among other factors,¹⁴ to the quality of productive public spending and hence the amount of corruption (and favoritism) in the economy (Mauro, 1997; Tanzi and Davoodi, 1998; and Jain, 2001). It is, for instance, argued that corrupted government may choose public projects with considerations other than efficiency, that lowers the level of overall quality and hence overall productivity of productive public spending¹⁵ (see, for example, Mauro, 1997; and Tanzi and Davoodi, 1998 for empirical evidence on the detrimental effects of corruption on investment and growth).

In the light of the above discussion it is possible to argue that ρ is positively (inversely) related to the quality of productive public spending (level

¹³This is formally shown by the expression: $\lim_{\substack{s_1^{np} \to 1}} \frac{\Gamma^*}{p} \Theta^{*2} [(1 + \frac{\delta_3}{\delta_2 \Psi})(\overline{g}_2^{np} + \frac{1}{\alpha} \overline{x}_2) + \rho(\overline{g}_1^{np} + \frac{1}{2} \overline{x}_1) - \frac{\delta_3}{\delta_2 \Phi} \rho \overline{g}_1^p] > 0.$

 $[\]frac{1}{\alpha}\overline{x}_{1}) - \frac{\delta_{3}}{\delta_{2}\Psi}\rho\overline{g}_{1}^{p}] > 0.$ ¹⁴For instance, ρ may depend on the level of development of a given country. It is frequently argued that the returns from infrastructure spending are expected to be higher in developing countries (see, for example, World Bank, 1994).

 $^{^{15}\}mathrm{See}$ Chapter 2 for more detail.

of corruption). This suggest that the *effective* productivity coefficient is equal to $\boldsymbol{\varphi} = c\rho$ where c denotes the level of quality of productive public spending, $0 \leq c \leq 1$, and ρ is assumed to be the value of the productivity coefficient under the absence of corruption (or under the full quality c = 1).

To analyze the role of corruption on macroeconomic performance, Table 4.1 is formed in line with Table 3.4 of the previous chapter. Table 4.1 shows the output gap, public spending gap and the inflation rate in the second period under the presence of corruption.¹⁶

Table 4.1 Output Gap, Public Spending Gap and Inflation Rate Under the Presence of Corruption

| $(\overline{x}_2 - x_2) = \frac{\delta_2}{\alpha} \Psi[\frac{1}{\alpha} \overline{x}_2 + \overline{g}_2^{np} - c\rho g_1^p]$ |
|--|
| $(\overline{g}_2^{np} - g_2^{np}) = \Psi[\frac{1}{lpha}\overline{x}_2 + \overline{g}_2^{np} - c ho g_1^p]$ |
| $\pi_2 = \frac{2\delta_2}{\delta_1} \Psi[\frac{1}{\alpha} \overline{x}_2 + \overline{g}_2^{np} - c\rho g_1^p]$ |

As can be seen from Table 4.1, the favorable effect of the first period's productive public spending on the second period's macroeconomic outcomes undoubtedly positively related to the quality of productive public spending (c) and hence inversely related to the level of corruption in the economy.

Proposition 4 formalizes the above arguments.

Proposition 4 The higher (lower) the level of corruption (quality of productive public spending committed in the first period) the higher the inflation, nonproductive public spending gap and output gap; hence, the worse the macroeconomic performance in the final period. That is, for a given level of g_1^p , the higher (lower) the c, the lower (higher) the π_2 , $(\overline{g}_2^{np} - g_2^{np})$ and $(\overline{x}_2 - x_2)$.

¹⁶Note that the only modification to the basic dynamic model of the previous chapter is that ρ is replaced with $\hat{\rho}$ (= $c\rho$) and the optimal policy outcomes in the final-period (t = 2) are derived, for a given level of g_1^p , as in Appendix E.

Proof. The derivative of π_2 with respect to c is $\frac{-2\delta_2}{\delta_1}\rho\Psi g_1^p$, which is unambiguously negative. Similarly, the derivative of $(\overline{g}_2^{np} - g_2^{np})$ with respect to c is $-\rho\Psi g_1^p$, which is again negative. The derivative of $(\overline{x}_2 - x_2)$ with respect to c is $-\rho\Psi \frac{\delta_2}{\alpha}g_1^p$, which is also unambiguously negative.

Proposition 4 states that the favorable effect of productive public spending depends on the amount of corruption in the economy. As noted in Chapter 2, socio-political characteristics that affect the degree of political instability and polarization are likely to affect the amount of corruption in the economy (see, for example, Easterly and Levine (1997) and Mauro (1997) for empirical evidence).¹⁷

4.3 Political Economy of Composition of Fiscal Adjustment

The conventional or Keynesian view argues that fiscal consolidations are contractionary. In contrast, current line of research provided empirical evidence, notably from the experiences of Denmark and Ireland, on the expansionary consequences of some types of fiscal adjustments (see, for example, Giavazzi and Pagano, 1990; Perotti, 1996; and Alesina *et al.*, 1998). The clear implication of the findings of these studies is that composition of fiscal adjustments matters for output performance. More specifically, it is argued that adjustments that entail largely current or social transfer expenditure cuts are expansionary while fiscal consolidations involving largely public investment cuts are shown to be contractionary. In other words, while the former type of fiscal adjustment produces the conventional or Keynesian effects, the latter type produces Non-Keynesian effects.

Early theoretical models on expansionary contractions or on the so-called Non-Keynesian effects mainly suggested the favorable wealth and expectations

 $^{^{17}\}mathrm{See}$ Section 2.4 for more detail.

effects of a cut in public consumption on private consumption and the credibility effects on interest rates (see Chapter 2). In contrast, the macroeconomic framework of Part I suggests an alternative channel for Non-Keynesian effects of fiscal adjustments based on the productivity enhancing role of productive public spending. Within the context of this framework, if the incumbent government perform the cut in public spending by reducing productive public spending (via reducing it's target), which is a politically easy option, the future productivity as well as equilibrium output falls and hence the conventional Keynesian effects are obtained. If, on the other hand, the incumbent becomes successful in reducing non-productive or popular public spending (via reducing it's target), which raises available resources for productive public spending by softening the budget constraint, then the effect of fiscal adjustment is an expansion, as was observed in some country experiences, e.g. Denmark and Ireland. Even though this last option - reducing popular public spending instead of productive spending - provide better prospects for future, it is politically difficult and risky strategy for the incumbent, especially in unstable political environment, when the opponent is more likely to be the one reaping the benefits.

4.4 Conclusion

This chapter has explored the role of a number of politico-economic factors on the composition of public spending by utilizing the basic dynamic model.

Overall, the main results of this chapter suggest that myopic and populist policies and associated public investment performance (similar to those experienced by a number of developing countries as noted in Chapter 1) may be the equilibrium outcome for a given set of political economy factors.

More specifically, it is shown that in countries with greater income inequality, social and ethnic fractionalization and the resulting political instability, governments are more likely to opt for popularity-enhancing (non-productive) spending at the expense of productivity-enhancing spending such as public investment. In other words, a rise in political instability and polarization, by driving-up the share of the policy maker's target for popular public spending, leads to a higher equilibrium share of non-productive spending in total public spending in the first period and thus results in a worse macroeconomic performance in the final period. In contrast to the previous work that emphasized the negative effects of political instability and polarization on investment and hence on output, these results suggest that political instability and polarization of public spending.

Likewise, it has also shown that if the incumbent government faces a low probability of re-election then the incumbent is more likely to favor nonproductive public spending at the expense of productive public spending since it may not hold office in the next period (to realize the favorable effects of productive public spending made in the previous period). Thus, electoral uncertainty also plays a crucial role on the composition of public spending and may have a detrimental consequences for macroeconomic outcomes, by leading to a strategic political behavior.

These results, for instance, shed some light on Turkey's populist and myopic policies and associated fall in the share of public investment in total public spending (as well as in the public investment-output ratio) during the late 1980s and the early and mid-1990s.¹⁸

Moreover, the results in this chapter indicate that the qualitative aspects

¹⁸It is widely argued that a rise in the level of political instability and polarization was a main cause of populist and myopic policies and associated disappointing macroeconomic performance during that period. However, as it is noted in the next chapter, public spending and the debt dynamics of the Turkish economy over the late 1980s and the 1990s are realized under a special set of circumstances. Therefore, the aforementioned results could at most provide *partial* explanations to the certain aspects of the public spending dynamics of the Turkish economy during that period. See Chapter 6 for an evaluation of public spending dynamics of the Turkish economy for that period.

of fiscal policy also matter for macroeconomic performance. That is, the size of the favorable effect of productive public spending depends positively on the quality of productive public spending and hence inversely related to the amount of corruption in the economy.

Finally, the simple dynamic macroeconomic framework of Part I also provides a political economy explanation for the observed Non-Keynesian or expansionary effects of fiscal adjustment. If the incumbent government reduces popular public spending, e.g. transfer expenditures, rather than productive public spending, then Non-Keynesian effects are achieved, however if the incumbent does the reverse by reducing productive public spending instead of popular public spending, which is a politically less costly strategy, then the conventional Keynesian effects are achieved.

CHAPTER 5

THE ROLE OF PUBLIC DEBT AND THE CAPITAL BORROWING RULE ON PUBLIC SPENDING AND MACROECONOMIC PERFORMANCE

5.1 Introduction

Public borrowing as a source of financing of government outlays was excluded from the macroeconomic policy making framework developed so far.¹ In reality, however, public borrowing is a frequently resorted source of financing public expenditures in addition to the other sources; tax and seigniorage. Furthermore, public borrowing creates an *inter*temporal link between the *current* government and *uncertain* future government via influencing the policy decisions both in the current and the future periods.² For instance, if the

¹A balanced budget condition (rule) was assumed in each and every period in the simple dynamic models of Chapter 3 as well as Chapter 4 to abstract from the issues of public borrowing. Thus, the only *inter*temporal link in those models is due to the favorable effect of productive public spending on output in the following period.

²As mentioned in Chapter 2, public borrowing is an *inter*temporal policy tool that creates trade-off between current and future public spending. Policy makers, for instance, could

incumbent government resort to public borrowing to finance popular or nonproductive public spending, this policy action usually necessities painful or unpopular future fiscal adjustments, implying future public spending cuts or tax increases by the successor.

This *inter*temporal nature of public borrowing is arguably has even more serious consequences on macroeconomic performance in developing countries. For instance, due to the underdeveloped nature of domestic financial markets, domestic borrowing has more vital implications on macroeconomic performance in these countries.³ More importantly, political instability (and polarization) is persistent and important feature of economic policy making in many developing countries and it can have serious implications for public borrowing decisions. High level of political instability, for instance, may lead to myopic and strategic behavior in the form of excessive budget deficits and strategic debt accumulation (see, for example, Persson and Svensson, 1989; Alesina and Tabellini, 1990; and Aghion and Bolton, 1990).⁴ Moreover, in the case when the future governments delay fiscal adjustment,⁵ future fiscal imbalances, emanating from excessive budget deficits and strategic debt accumulation, may result in a significant rise in inflation and fiscal instability, possibly due to monetization and further borrowing. If this process continues the end result would inevitably be a severe economic crisis entailing a severe

spend more by borrowing (or running budget deficit) in the current period at the expense of future public spending, since the borrowed amount (plus the interest) is to be paid by future periods' resources which would otherwise have been used for other types of public spending.

³The experience of Turkey (as well as the other countries, e.g. Brazil) during the 1990s have shown that the banking sector have played a significant role in shaping the debt structure as the primary buyer of the government bonds and T-bills in the shallow market. This, in turn, led to a serious macroeconomic consequences for the Turkish economy. For instance, during the 1990s government's rising demand for domestic borrowing relative to the shallow size and the structure of the market has been the main factor fuelling the real interest rates, e.g. real interest rate on net debt of public sector almost doubled from 1990 to 1999. See Chapter 7 for an overview of the domestic debt dynamics and its macroeconomic consequences on the Turkish economy during the 1980s and the 1990s.

⁴See Chapter 2 for more detail.

⁵A high level of political instability and polarization is a crucial factor leading to delays of fiscal adjustment or stabilizations (see, for example, Veiga, 2000 for empirical evidence). See Chapter 2 for more detail.

fiscal consolidation.

A number of authors have argued that a binding debt rule, such as a balanced budget rule, could prevent myopic public borrowing or strategic debt accumulation, possibly resulting from a high level of political instability and polarization (see Chapter 2). However, such rules can have serious drawbacks. For example, a binding debt rule may result in underinvestment as was observed in many members of European Monetary Union.⁶ In other words, such a rule can shift strategic manipulation by politicians from public debt policy to spending policy (Dur et al., 1998). Nevertheless, several authors argue that a capital borrowing rule, which allows government to use additional borrowing for financing public investment only, could prevent the strategic use of public borrowing as well as public spending (See, for example, Dur et al., 1998; and Ballassone and Franco, 2000). Additionally, it is also frequently argued that such a rule is "prudent"⁷ and it is frequently called as the "golden rule" of public financing. This rule has been applied in several countries such as US, Holland and UK. Nevertheless, an understanding of the role of a capital borrowing rule on public investment and macroeconomic performance is also of paramount importance for the developing countries, given the significant role of political instability on the public spending and borrowing decisions. Moreover, as the productivity of public investment is expected to be high in these countries any policy favoring non-productive (or popular) public spending at the expense of productive spending tend to be more harmful for them.

The main aim of this chapter, therefore, is to analyze the role of domestic public borrowing on public spending decisions and macroeconomic performance. In particular, this chapter analyzes the role of political instability on public debt policy; that is, it investigates the issue of strategic debt ac-

⁶These countries had cut public investment to cope with a set of fiscal rules (close to balanced budget condition) imposed on their budget deficits by the Stability and Growth Pact. See Chapter 2 for more detail.

⁷However, Buiter (1998) argues that such a rule is *not* "prudent". See Chapter 2 for more detail.

cumulation. Furthermore, it also investigates the impact of public borrowing decisions on the policy maker's public spending choice, with a special emphasis on productive spending, and macroeconomic outcomes. Moreover, this chapter is particularly interested in the consequences of capital borrowing rule on macroeconomic performance. Additionally, it focuses on the effects of capital borrowing rule on strategic political behavior; namely, strategic use of public spending and debt policies.

The macroeconomic framework that has been developed so far also enables us to investigate the aforementioned issues of public borrowing. Therefore, the remainder of this chapter is organized as follows. Section 5.2 extends the static benchmark model in Chapter 3, where public spending is totally nonproductive, into a two-period simple dynamic model by incorporating public borrowing. The policy maker's choice of financing of public spending is generalized first and, then, the role of public borrowing on public spending and on the overall macroeconomic performance is analyzed to provide a basis for later comparisons. This section also explores the role of strategic debt accumulation on public spending decisions and macroeconomic performance. Section 5.3 extends the analysis of Section 5.2 by considering the role of productivityenhancing public spending in addition to public borrowing. Section 5.4 analyzes the effects of capital borrowing rule on strategic political behavior and on macroeconomic performance. This section is particularly interested in the effects of capital borrowing rule on public spending decisions, especially on productive spending. Finally, Section 5.5 concludes the chapter.

5.2 An Extended Model with Debt Dynamics

This section extends the static *centralized* benchmark model (Section 3.2) into a simple dynamic model by incorporating public borrowing to the macroeconomic framework of that model.^{8,9}

5.2.1 Model

For the sake of convenience, the full set-up of the model is provided below.

Output

Output supply function is the same as in the static benchmark case and given as follows,

$$x_t = \alpha (\pi_t - \pi_t^e - \tau_t) \tag{5.1}$$

where all the variables are as defined before (see Section 3.2).

Preferences and the Budget Constraint of the Policy Maker

The loss function is also the same as in the static benchmark case,¹⁰

$$L_t^G = \frac{1}{2} \sum_{t=1}^{K=2} \beta_G^{t-1} [\delta_1 \pi_t^2 + (x_t - \overline{x}_t)^2 + \delta_2 (g_t^{np} - \overline{g}_t^{np})^2]$$
(5.2)

where all the variables are defined as before (see Section 3.2).

The crucial change in this new set-up is in the budget constraint. The balanced budget assumption of the previous two chapters is relaxed by incorporating public borrowing. By doing so, the following intertemporal budget constraint is obtained,

⁸Similar variants of this model are used, for example, by Jensen (1994), Kipici and Ozkan (1998), and Beetsma and Bovenberg (1997b, 1999).

⁹This section continues to utilize a policy making framework such that a single authority responsible for both fiscal policy and monetary policy.

¹⁰Recall that public spending, which is denoted as g, is totally unproductive in the static benchmark model of Chapter 3. For the sake of later comparison (and further extension) with the basic dynamic model, public spending, which is totally unproductive, will be denoted as g^{np} .

$$g_t^{np} + (1 + r_{t-1})d_{t-1} = \tau_t + \pi_t + d_t$$
(5.3)

where d_{t-1} denotes the amount of single-period indexed¹¹ public debt (as a ratio of output) issued in period t-1 and to be paid in period t, r_{t-1} represents the cost of borrowing (the real interest rate) in period t-1 and d_t represents the new debt issue (as a ratio of output) in period t, and all the other variables are as defined before (see Appendix H for the derivation of Equation (5.3)).

The left side of the budget constraint consists of government outlays on public non-productive expenditure and debt service (interest payment plus principal payment; $r_{t-1}d_{t-1}$ and d_{t-1} , respectively). The right side indicates that taxes, seigniorage and new issues of debt are the three sources for financing the government outlays. This simple intertemporal budget equation also provides some preliminary and useful information on the effects of the burden of debt service on the economy. For this purpose, Equation (5.3) can be re-arranged as follows,

$$(1+r_{t-1})d_{t-1} = (\tau_t - g_t^{np}) + d_t + \pi_t$$
(5.4)

This equation simply indicates that there are three possible options for debt service in this set-up: (1) cutting the primary deficit or achieving primary surplus (as a ratio to output);¹² (2) issuing new debt; (3) raising seigniorage revenue by money creation.

¹¹Indexed debt assumption seems to be a valid assumption for high inflation countries like Turkey (see, for example, Dornbusch *et al.*, 1998: 148). However, it should be noted here that in the presence of non-indexed debt, the policy maker may face another incentive for surprise inflation: lowering the ex-post real interest rate with surprise inflation.

¹²Primary surplus, i.e. $(\tau_t - g_t^{np}) > 0$, could be achieved either by lowering public spending or raising taxes.

5.2.2 Equilibrium Macroeconomic Outcomes

Equilibrium outcomes are derived by backwards induction (see Appendix I for the technical details on the derivation of the result for both t = 2 and t = 1). Table 5.1 contains the final-period optimal policy outcomes, for a given level of d_1 (Note that no new debt is issued in t = 2, since it is the final-period, i.e. $d_2 = 0$).

 Table 5.1 Final-period Optimal Policy Outcomes: An Extended

 Model with Debt Dynamics

| | $\pi_2 = \frac{2\delta_2}{\delta_1} \Psi[\frac{1}{\alpha} \overline{x}_2 + \overline{g}_2^{np} + (1+r_1)d_1]$ | |
|-------|--|------------------|
| | $x_2 = Z\overline{x}_2 - \frac{\delta_2}{\alpha}\Psi[\overline{g}_2^{np} + (1+r_1)d_1]$ | |
| | $g_2^{np} = \Psi[\phi \overline{g}_2^{np} - (1+r_1)d_1 - \frac{1}{\alpha}\overline{x}_2]$ | |
| | $\tau_2 = \tfrac{\delta_2}{\alpha^2} \Psi[\overline{g}_2^{np} + (1+r_1)d_1] - Z \tfrac{1}{\alpha} \overline{x}_2$ | |
| Note: | $\phi = rac{\delta_2}{lpha^2} + rac{2\delta_2}{\delta_1}, \Psi = rac{1}{(1+\phi)}, Z = (1-rac{\delta_2}{lpha^2} \Psi)$ | $(\dot{y}) > 0.$ |

As mentioned before, policy maker decides on the amount of public borrowing in addition to the other sources of financing (inflation rate and tax rate) while making public spending decisions in t = 1. Therefore, the policy maker makes his choice by distributing distortions among both *intra*temporal and *inter*temporal instruments in t = 1. More formally, the central policy maker chooses π_1, τ_1, g_1^{np} and d_1 subject to the constraints in t = 1. Table 5.2 contains the equilibrium outcomes in t = 1 as well as in t = 2,¹³ which will be utilized in below analysis.

¹³See Appendix I for the technical details on the derivation of the result for t = 1. Note that by substituting the equilibrium value of d_1 into the final-period optimal policy outcomes contained in Table 5.1, we could obtain the equilibrium values of inflation, public spending, taxes and output in t = 2.

| $d_1 = P[\overline{g}_1^{np} - \mathbf{p}\overline{g}_2^{np} + \frac{1}{\alpha}\overline{x}_1 - \frac{\mathbf{p}}{\alpha}\overline{x}_2]$ |
|--|
| $g_1^{np} = (1 - \Psi H)\overline{g}_1^{np} - P \mathbf{A}[\frac{1}{\alpha}\overline{x}_2 + \overline{g}_2^{np}] - \Psi H \frac{1}{\alpha}\overline{x}_1$ |
| $\pi_1 = \frac{2\delta_2}{\delta_1} \left[P \mathbf{A} [\frac{1}{\alpha} \overline{x}_2 + \overline{g}_2^{np}] + \Psi H [\frac{1}{\alpha} \overline{x}_1 + \overline{g}_1^{np}] \right]$ |
| $x_1 = -\frac{\delta_2}{\alpha} [P \mathbf{A} [\frac{1}{\alpha} \overline{x}_2 + \overline{g}_2^{np}] + \Psi H \overline{g}_1^{np}] + \mathbf{\Psi} \overline{x}_1$ |
| $\tau_1 = \frac{\delta_2}{\alpha^2} [P \mathbf{A} [\frac{1}{\alpha} \overline{x}_2 + \overline{g}_2^{np}] + \Psi H \overline{g}_1^{np}] - \mathbf{P} \frac{1}{\alpha} \overline{x}_1$ |
| $g_2^{np} = (\phi + H)\Psi\overline{g}_2^{np} - P\Psi\frac{1}{\alpha}\overline{x}_2 - (1+r_1)\Psi P[\overline{g}_1^{np} + \frac{1}{\alpha}\overline{x}_1]$ |
| $\pi_2 = P \frac{2\delta_2}{\delta_1} \Psi[\frac{1}{\alpha} \overline{x}_2 + \overline{g}_2^{np}] + (1+r_1) \frac{2\delta_2}{\delta_1} \Psi P[\overline{g}_1^{np} + \frac{1}{\alpha} \overline{x}_1]$ |
| $x_2 = (Z + \frac{\delta_2}{\alpha^2} \Psi H) \overline{x}_2 - P \frac{\delta_2}{\alpha} \Psi \overline{g}_2^{np} - \frac{\delta_2}{\alpha} \Psi (1 + r_1) P[\overline{g}_1^{np} + \frac{1}{\alpha} \overline{x}_1]$ |
| $\tau_2 = P \frac{\delta_2}{\alpha^2} \Psi \overline{g}_2^{np} - (Z + \frac{\delta_2}{\alpha^2} \Psi H) \frac{1}{\alpha} \overline{x}_2 + \frac{\delta_2}{\alpha^2} \Psi (1 + r_1) P[\overline{g}_1^{np} + \frac{1}{\alpha} \overline{x}]$ |

Table 5.2 Equilibrium Macroeconomic Outcomes in t = 1 and t = 2: An Extended Model with Debt Dynamics

 $\begin{aligned} &Note: \ \phi = \frac{\delta_2}{\alpha^2} + \frac{2\delta_2}{\delta_1}, \Psi = \frac{1}{(1+\phi)}, \mathsf{Z} = (1 - \frac{\delta_2}{\alpha^2}\Psi) > 0, D = \frac{2\delta_2}{\delta_1}\Psi^2 + \Psi, \mathsf{A} = \\ &(1+r_1)\beta_G D, \mathsf{P} = \frac{\mathsf{A}}{\Psi} = \frac{(1+r_1)\beta_G}{\Psi} D, P = \frac{1}{1+(1+r_1)\mathsf{P}} = 1 - H, H = (1+r_1)\mathsf{P} P = \\ &\frac{(1+r_1)\mathsf{P}}{1+(1+r_1)\mathsf{P}}, \mathsf{P} = \mathsf{I} - \frac{\delta_2}{\alpha^2}\Psi H > 0. \end{aligned}$

Unfavorable Effects of Public Borrowing on Future Macroeconomic Performance

To analyze the unfavorable effects of borrowing on future period's macroeconomic performance, Table 5.3 contains the three macroeconomic performance indicators (output gap, public spending gap and inflation rate) that the government is concerned about in t = 2.

As it is evident from Table 5.1 and 5.3, the restraining or unfavorable effect of previous period's public borrowing on current period's taxes obviously raises the distortions in the economy (since taxes are distortionary). This, in turn, lowers output and public spending, and raises the inflation rate.

In summary, the higher the public borrowing in the first period the higher the inflation rate, non-productive public spending and output gaps; hence, the worse is the macroeconomic performance in the final period. That is, the higher the d_1 , the higher are the π_2 , $(\overline{g}_2^{np} - g_2^{np})$ and $(\overline{x}_2 - x_2)$.

Table 5.3 Output Gap, Public Spending Gap and Inflation Rate:An Extended Model with Debt Dynamics

| $(\overline{x}_2 - x_2) = \frac{\delta_2}{\alpha} \Psi[\frac{1}{\alpha} \overline{x}_2 + \overline{g}_2^{np} + (1 + r_1)d_1]$ |
|---|
| $(\overline{g}_2^{np} - g_2^{np}) = \Psi[\frac{1}{\alpha}\overline{x}_2 + \overline{g}_2^{np} + (1+r_1)d_1]$ |
| $\pi_2 = \frac{2\delta_2}{\delta_1} \Psi[\frac{1}{\alpha}\overline{x}_2 + \overline{g}_2^{np} + (1+r_1)d_1]$ |

Public Borrowing and Spending: Trade-offs and Asymmetries

The policy maker could expand his resources in the current period and, in turn, raise his public spending, by borrowing now at the expense of lowering available resources for public spending later.¹⁴ This implies that the policy maker faces an *inter*temporal trade-off between the costs and the benefits of borrowing. That is, while borrowing raises current public spending, it lowers resources for future public spending.

Table 5.4 provides the comparative statics, which will be utilized in analyzing the trade-offs and associated asymmetries arising from public borrowing.

As can be seen from Table 5.4, the intertemporal nature of public borrowing (via the budget constraint) creates an interesting intertemporal trade-offs and associated asymmetries. There is an asymmetry, for example, with respect to the effects of current vs. future public spending targets on public borrowing. As it is revealed from Table 5.4, while a rise in \overline{g}_1^{np} raises d_1 , a rise in \overline{g}_2^{np} lowers it. Similarly, there is an asymmetry between the effects of

$$g_2^{np} = \pi_2 + \tau_2 - (1+r_1)d_1$$

¹⁴The budget constraint of the government in t = 2 can be re-written as follows

As can be seen from the above equation, the higher the public borrowing in t = 1 the lower the public spending in t = 2.

current and future public spending targets on current and future actual public spending. While a rise in \overline{g}_1^{np} raises (lowers) current (future) public spending, a rise in \overline{g}_2^{np} raises (lowers) future (current) public spending, as can be seen from Table 5.4. These asymmetries are due to the above mentioned intertemporal link (via the budget constraint); that is, a rise in public spending financed by borrowing in the current period is only possible by less public spending in the next period. There exists another asymmetry between the effects of current and future output target on actual current and future output. As can be seen from Table 5.4, while a rise in \overline{x}_1 raises (lowers) current (future) output, a rise in \overline{x}_2 raises (lowers) future (current) output. Similarly, there is an additional asymmetry with respect to the effects of current and future output targets on public borrowing in first period. While a rise in \overline{x}_1 raises d_1 , a rise in \overline{x}_2 lowers it, as it is revealed from Table 5.4. These last two asymmetries are due to the effects of public borrowing on the distortions in the economy. That is, while borrowing lowers the distortionary losses in t = 1 by lowering the need for distortionary tax for financing public spending in that period, it raises the distortionary losses in t = 2 by requiring more distortionary taxes for financing the debt service arising from the borrowing in t = 1.

The main results are summarized as follows.

- The higher the current (future) public spending target the higher the current (future) public spending and the lower the future (current) public spending in equilibrium. Similarly, the higher the current (future) output target the higher the current (future) output and the lower the future (current) output in equilibrium. That is, the higher the \$\overline{g}_1^{np}\$ (\$\overline{g}_2^{np}\$) the higher (lower) the \$g_1^{np}\$ and the lower (higher) the \$g_2^{np}\$. Also, the higher the \$\overline{x}_1\$ (\$\overline{x}_2\$) the higher (lower) the \$x_1\$ and the lower (higher) the \$x_2\$.
- The higher the public spending target and the output target in future (today), the lower (higher) must be the equilibrium public borrowing today.

That is, the higher are $\overline{g}_2^{np}(\overline{g}_1^{np})$ and $\overline{x}_2(\overline{x}_1)$ the lower (higher) is the d_1 .

The next sub-section will discuss the strategic use of the debt policy which will shed some light on the above results.

| | $\uparrow \overline{g}_1^{np}$ | $\uparrow \overline{g}_2^{np}$ | $\uparrow \overline{x}_1$ | $\uparrow \overline{x}_2$ |
|-------------|--------------------------------|--------------------------------|---------------------------|---------------------------|
| d_1 | + | | + | |
| g_1^{np} | + | | | |
| π_1 | + | + | + | + |
| x_1 | _ | _ | + | _ |
| $\tau_{_1}$ | + | + | _ | + |
| g_2^{np} | | + | _ | _ |
| π_2 | + | + | + | + |
| x_2 | | _ | _ | + |
| $	au_2$ | + | + | _ | _ |

 Table 5.4 Comparative Statics: An Extended Model with Debt

Dynamics

Note: + indicates positive effect and - indicates negative effect.

5.2.3 Strategic Use of Debt Policy

Public borrowing is an intertemporal policy tool that links *current* government to *uncertain* future government. Therefore, the existence of electoral uncertainty may possibly lead to myopic policy making and associated strategic political behavior. New political economy theories on public debt have emphasized that political factors, such as political instability, seriously affect the incumbent government's public debt policy (see, for example, Persson and Svensson, 1989; and Alesina and Tabellini, 1990)¹⁵ It is, for instance, argued that a high level of political instability may lead to a myopic and strategic behavior in the form of inefficient budget deficits and excessive (or strategic) debt accumulation, by lowering the probability of re-election at the end of the current period.¹⁶

This section, therefore, analyzes the role of electoral uncertainty on the policy maker's public borrowing decisions. More specifically, it analyzes formally the role of political instability on public debt policy and the issue of strategic use of debt policy.

To explore the role of electoral uncertainty on the incumbent government's public borrowing decisions, the following timing of events are considered. Elections will take place at the end of the first period. That is, elections will be held after macroeconomic outcome is realized in t = 1 but before nominal wages are set in t = 2. This implies that optimal policy outcomes in that period will be the same as of the previous sub-section (i.e. $g_2^{np,E} = g_2^{np}$).

The following modifications are also performed to the above set-out model (Section 5.2.1).¹⁷ β_G , which represents the incumbent government's subjective discount factor under electoral *certainty*, is replaced with $\beta_G^* = p\beta_G$, which represents the incumbent's *effective* subjective discount factor and p denotes the incumbent's re-election probability.¹⁸ The resulting values of equilibrium public borrowing and public spending¹⁹ in the first period, prior to the election, are as follows²⁰

¹⁵See Chapter 2 for a condedsed overview of new political economy theories on public debt and inefficient budget deficits and related empirical evidence.

¹⁶Note that the previous chapter has shown that a high level of political instability may lead to myopic policies and associated strategic behavior in the form of low level of productive public spending.

¹⁷Note that the same modifications are performed as in Section 4.2.1.

¹⁸Recall that $\beta_G^* = \beta_G$ under electoral *certainty*, i.e. when p = 1.

¹⁹Equilibrium values of all other variables could be derived as in Appendix G.

 $^{^{20}}$ It should be noted here that the strategic behavior considered in this section (and also the one considered in the previous chapter) arises from the strategic interactions between different periods. High level of political instability that lowers the probability of re-election

$$d_1^E = P^* [\overline{g}_1^{np} - \mathbf{p}^* \overline{g}_2^{np} + \frac{1}{\alpha} \overline{x}_1 - \frac{\mathbf{p}^*}{\alpha} \overline{x}_2]$$
(5.5)

$$g_1^{np,E} = (1 - \Psi H^*)\overline{g}_1^{np} - P^* \mathbf{A}^* [\frac{1}{\alpha} \overline{x}_2 + \overline{g}_2^{np}] - \Psi H^* \frac{1}{\alpha} \overline{x}_1$$
(5.6)

where superscript E denotes equilibrium outcomes under electoral uncertainty, $\mathbf{\hat{R}}^* = (1+r_1)\beta_G^*D$, $\mathbf{\hat{P}}^* = \frac{\mathbf{\hat{R}}^*}{\Psi} = \frac{(1+r_1)\beta_G^*}{\Psi}D$, $P^* = \frac{1}{1+(1+r_1)\mathbf{\hat{P}}^*} = 1-H^*$, $H^* = (1+r_1)\mathbf{\hat{P}}^*P^*$, $\beta_G^* = p\beta_G$ and other variables are as defined before.

The following proposition summarizes the role of electoral uncertainty on public borrowing, prior to elections.

Proposition 5 The lower (higher) the incumbent's probability of reelection, p, the higher (lower) the equilibrium public borrowing in the first period, d_1^E .

Proof. The derivative of d_1^E with respect to p is $-\frac{\mathbf{b}^*}{p}P^{*2}[(\overline{g}_2^{np} + \frac{1}{\alpha}\overline{x}_2) + (1 + r_1)(\overline{g}_1^{np} + \frac{1}{\alpha}\overline{x}_1]$. Given that all these parameters are positive this derivative is unambiguously negative.

It is clear from the above proposition that electoral uncertainty would certainly lead to a strategic behavior. A high probability of being out of office in the next period implies that the incumbent government may not be the one in the office to incur the costs of public borrowing made in the previous period; hence, the incumbent is more likely to favor *current* public spending $(\partial g_1^{np,E}/\partial p < 0)$ at the expense of *future* public spending $(\partial g_2^{np,E}/\partial p =$ $(\partial g_2^{np,E}/\partial d_1^E)(\partial d_1^E/\partial p) > 0$, recall that $\partial g_2^{np,E}/\partial d_1^E < 0)$. Thus, a high level of political instability also has potentially unfavorable consequences for the future public spending and the overall macroeconomic performance, via strategic

in the next period leads to strategic behavior. However, strategic behavior may also result from political polarization and the differences in the form of institutional setting between fiscal and monetary authorities (see Chapter 2 for more detail).

debt accumulation process. This result is in line with the existing literature on the new political economy theories on public debt.

5.3 The Double Dynamics Model: Borrowing Vs. Productive Spending

The above analysis maintained that public spending is totally non-productive. In reality, governments also spend on productive categories such as infrastructure, education and health, that may well contribute towards the future productivity and output (see Chapters 2 and 3). In effect, the *inter*temporal nature of productive spending provides another channel, in addition to public borrowing, through which current policy makers impact upon future macroeconomic outcomes. Additionally, as discussed in Chapter 4 in more detail, the fact that the beneficial effects of productive public spending committed today are realized in future is another source of strategic behavior on the part of the incumbent, in addition to strategic nature of public borrowing. Thus, the *inter*temporal link through the positive effect of productive public spending on output in the following period²¹ should also be incorporated into the above setout model.²² By doing so a model with double dynamics is obtained. In other words, this section will develop a two-period model with double *inter*temporal links due to public borrowing and productive spending.

5.3.1 Model

The previous section's model can be modified by incorporating productive public spending into the macroeconomic framework.

 $^{^{21}\}mathrm{Note}$ that this is the only link in the simple dynamic models of Chapter 3 and 4.

 $^{^{22}}$ As mentioned in Chapter 3, it is useful to make a distinction between productive and non-productive public spending, *at least* at an analytical level. See Chapter 3 for more detail.
Output

Output supply function is the same as in the basic dynamic model,

$$x_t = \alpha (\pi_t + \rho g_{t-1}^p - \pi_t^e - \tau_t)$$
(5.7)

where all the variables are as defined before (see Section 3.3).

Preferences and the Budget Constraint of the Policy Maker

The loss function is also the same as in the basic dynamic model,

$$L^{G} = \frac{1}{2} \sum_{t=1}^{m} \beta_{G}^{t-1} [\delta_{1} \pi_{t}^{2} + (x_{t} - \overline{x}_{t})^{2} + \delta_{2} (g_{t}^{np} - \overline{g}_{t}^{np})^{2} + \delta_{3} (g_{t}^{p} - \overline{g}_{t}^{p})^{2}]$$
(5.8)

where all the variables are as defined before (see Section 3.3).

Similarly, the intertemporal budget constraint of the government can be simply modified to yield

$$g_t^{np} + g_t^p + (1 + r_{t-1})d_{t-1} = \pi_t + \tau_t + d_t$$
(5.9)

where all the variables are as defined before (see Sections 5.2 and 3.3).

Three sources of revenue; seignorage, taxes and borrowing will now be utilized to pay for three types of spending; non-productive expenditure, productive public expenditure and debt-service.

5.3.2 Equilibrium Macroeconomic Outcomes

Similar to the above, the model is solved starting from t = 2 for given levels of productive public spending and borrowing in t = 1; g_1^p and d_1 . Once the equilibrium values are known for t = 2 it is straightforward to solve the policy maker's loss minimization problem in t = 1.

Table 5.5 provides the optimal policy outcomes, for given levels of d_1 and g_1^p , in t = 2 (see Appendix J for the technical details on the derivation of the results for t = 2)

Table 5.5 Final-period Optimal Policy Outcomes: The Double Dynamics Model

| | $\pi_2 = \frac{2\delta_2}{\delta_1} \Psi[\frac{1}{\alpha} \overline{x}_2 + \overline{g}_2^{np} + (1+r_1)d_1 - \rho g_1^p]$ | |
|----|--|----|
| | $x_2 = Z\overline{x}_2 - \tfrac{\delta_2}{\alpha}\Psi[\overline{g}_2^{np} + (1+r_1)d_1 - \rho g_1^p]$ | |
| | $g_2^{np} = \Psi[\phi \overline{g}_2^{np} - \frac{1}{\alpha} \overline{x}_2 - (1+r_1)d_1 + \rho g_1^p]$ | |
| | $\boxed{\tau_2 = \frac{\delta_2}{\alpha^2} \Psi[\overline{g}_2^{np} + (1+r_1)d_1] - Z\frac{1}{\alpha}\overline{x}_2 + \rhoZg_1^p}$ | |
| Nc | ote: $\phi = \frac{\delta_2}{\alpha^2} + \frac{2\delta_2}{\delta_1}, \Psi = \frac{1}{(1+\phi)}, Z = (1 - \frac{\delta_2}{\alpha^2}\Psi) >$ | 0. |

In t = 1, the central policy maker chooses $\pi_1, \tau_1, g_1^{np}, g_1^p$ and d_1 subject to the constraints. By doing so, he distributes distortions among both intratemporal and intertemporal instruments. Table 5.6 contains the equilibrium outcomes in t = 1 (see Appendix J for the technical details on the derivation of the result for t = 1).²³

²³Note that by substituting the equilibrium values of d_1 and g_1^p into the final-period optimal policy outcomes contained in Table 5.5, we could obtain the equilibrium values of inflation, public spending, taxes and output in t = 2. However, we will provide the results in qualitative form for the sake of simplicity, due the complicated structure of the double dynamics model.

Table 5.6 Equilibrium Macroeconomic Outcomesin t = 1: The Double Dynamics Model

$$\begin{split} & \frac{g_1^p = O[\overline{g}_1^{np} + \frac{\overline{x}_1}{\alpha} + \frac{1}{(1+r_1)}(\frac{\overline{x}_2}{\alpha} + \overline{g}_2^{np})] + E\overline{g}_1^p}{g_1^{np} = -O'[\frac{\overline{x}_1}{\alpha} + \frac{1}{(1+r_1)}(\frac{\overline{x}_2}{\alpha} + \overline{g}_2^{np})] + (1-E)\frac{(1+r_1)}{\rho_N}\frac{\delta_3}{\delta_2}\overline{g}_1^p + (1-O')\overline{g}_1^{np}}{d_1 = Z'0[\overline{g}_1^{np} + \frac{\overline{x}_1}{\alpha}] + (B-1)Z\frac{\delta_3}{\delta_2}\overline{g}_1^p + (Z'0-1)\frac{1}{(1+r_1)}(\frac{\overline{x}_2}{\alpha} + \overline{g}_2^{np})}{\pi_1 = \frac{2\delta_2}{\delta_1}[O'(\overline{g}_1^{np} + \frac{\overline{x}_1}{\alpha} + \frac{1}{(1+r_1)}(\frac{\overline{x}_2}{\alpha} + \overline{g}_2^{np})) + (E-1)\frac{(1+r_1)}{\rho_N}\frac{\delta_3}{\delta_2}\overline{g}_1^p]} \\ \hline \pi_1 = -\frac{\delta_2}{\alpha}[O'(\overline{g}_1^{np} + \frac{1}{(1+r_1)}(\frac{\overline{x}_2}{\alpha} + \overline{g}_2^{np})) + (E-1)\frac{(1+r_1)}{\rho_N}\frac{\delta_3}{\delta_2}\overline{g}_1^p] + \frac{1}{1-\frac{\delta_2}{\alpha^2}}O'^{\frac{1}{\nabla}}\overline{x}_1} \\ \hline \pi_1 = \frac{\delta_2}{\alpha^2}[O'(\overline{g}_1^{np} + \frac{1}{(1+r_1)}(\frac{\overline{x}_2}{\alpha} + \overline{g}_2^{np})) - (1-E)\frac{(1+r_1)}{\rho_N}\frac{\delta_3}{\delta_2}\overline{g}_1^p] - \frac{1}{1-\frac{\delta_2}{\alpha^2}}O'^{\frac{1}{\nabla}}\frac{\overline{x}_1}{\alpha}} \\ \hline \pi_1 = \frac{\delta_2}{\alpha^2}[O'(\overline{g}_1^{np} + \frac{1}{(1+r_1)}(\frac{\overline{x}_2}{\alpha} + \overline{g}_2^{np})) - (1-E)\frac{(1+r_1)}{\rho_N}\frac{\delta_3}{\delta_2}\overline{g}_1^p] - \frac{1}{1-\frac{\delta_2}{\alpha^2}}O'^{\frac{1}{\nabla}}\frac{\overline{x}_1}{\alpha}} \\ \hline \pi_1 = \frac{\delta_2}{\alpha^2}[O'(\overline{g}_1^{np} + \frac{1}{(1+r_1)}, (\overline{g}_2 + \overline{g}_2^{np})) - (1-E)\frac{(1+r_1)}{\rho_N}\frac{\delta_3}{\delta_2}\overline{g}_1^p] - \frac{1}{1-\frac{\delta_2}{\alpha^2}}O'^{\frac{1}{\nabla}}\frac{\overline{x}_1}{\alpha}} \\ \hline \pi_1 = \frac{\delta_2}{\alpha^2}[O'(\overline{g}_1^{np} + \frac{1}{(1+r_1)}, (\overline{g}_2 + \overline{g}_2^{np})) - (1-E)\frac{(1+r_1)}{\rho_N}\frac{\delta_3}{\delta_2}\overline{g}_1^p] - \frac{1}{1-\frac{\delta_2}{\alpha^2}}O'^{\frac{1}{\nabla}}\frac{\overline{x}_1}{\alpha}} \\ \hline Note: \rho_N = \rho - (1+r_1), \phi = \frac{\delta_2}{\alpha^2} + \frac{2\delta_2}{\delta_1}, \Psi = \frac{1}{(1+r_1)\rho_N}, D = \frac{2\delta_2}{\delta_1}\Psi^2 + \Psi, \\ A = \rho\beta_G D, K = \frac{1+r_1}{\Psi} + \frac{1}{(1+r_1)\beta_G D}, O = \frac{(1+r_1)\rho_N}{(1+r_1)K\frac{\delta_3}{\delta_2}+\rho_N^2}, O' = \frac{(1+r_1)^2\frac{\delta_3}{\delta_2}}{(1+r_1)K\frac{\delta_3}{\delta_2}+\rho_N^2}, \\ E = \frac{(1+r_1)K\frac{\delta_3}{\delta_2}}{(1+r_1)K+\rho_N\Lambda(1+r_1)K} \text{ and } Z'O = \frac{\frac{\delta_3}{2\beta_2\beta_D}+\rho_N}{(1+r_1)\frac{\delta_3}{\delta_2}K+\rho_N^2}. \end{aligned}$$

Next sub-section turn to some of the issues arising from these outcomes.

Consequences of Public Borrowing and Productive Spending on Future Macroeconomic Performance

The asymmetric effects of public borrowing and productive public spending on the next period's macroeconomic performance is evident from Tables 5.7 and 5.8, which provide the comparative statics and the macroeconomic performance indicators, respectively, for t = 2.

Tables 5.7 and 5.8 underline the opposite effects of public borrowing and productive public spending on future macroeconomic performance. That is, a rise in the current period's public borrowing (productive public spending) has an *un*favorable (favorable) effects on the next period's macroeconomic performance. More specifically, the higher the public borrowing (public investment) in the first period, the higher (lower) the inflation rate, the public spending and the output gaps; hence, the worse (better) is the macroeconomic performance in the final period. Note that these results are exactly the same as the results obtained in the previous section and Section 3.3 (see Tables 3.2 and 5.1).

Table 5.7 Comparative Statics in t = 2: The Double Dynamics Model

| | $\uparrow \overline{g}_2^{np}$ | $\uparrow \overline{x}_2$ | $\uparrow g_1^p$ | $\uparrow d_1$ |
|------------|--------------------------------|---------------------------|------------------|----------------|
| g_2^{np} | + | | + | |
| x_2 | _ | + | + | _ |
| π_2 | + | + | — | + |
| $	au_2$ | + | _ | + | + |

Table 5.8 Output Gap, Public Spending Gap and Inflation Rate: The Double Dynamics Model

| $(\overline{x}_2 - x_2) = \frac{\delta_2}{\alpha} \Psi[\frac{1}{\alpha} \overline{x}_2 + \overline{g}_2^{np} + (1 + r_1)d_1 - \rho g_1^p]$ |
|---|
| $\left(\overline{g}_2^{np} - g_2^{np}\right) = \Psi\left[\frac{1}{\alpha}\overline{x}_2 + \overline{g}_2^{np} + (1+r_1)d_1 - \rho g_1^p\right]$ |
| $\pi_2 = \frac{2\delta_2}{\delta_1} \Psi[\frac{1}{\alpha} \overline{x}_2 + \overline{g}_2^{np} + (1+r_1)d_1 - \rho g_1^p]$ |

Determinants of Public Borrowing and Productive Spending in the

Current Period

The analysis of the previous section has shown that *current* public borrowing and productive spending have opposite effects on future macroeconomic performance. Consequently, the determinants of public borrowing versus productive spending in t = 1 are also likely to be different. To explore these issues, Table 5.9 presents how the equilibrium values of the choice variables in t = 1respond to the policy maker's targets.

Table 5.9 Comparative Statics in t = 1: The Double Dynamics Model

| | $\uparrow \overline{x}_2$ | $\uparrow \overline{x}_1$ | $\uparrow \overline{g}_2^{np}$ | $\uparrow \overline{g}_1^{np}$ | $\uparrow \overline{g}_1^p$ |
|-----------------------|---------------------------|--|--------------------------------|--------------------------------|-----------------------------|
| d_1 | ?* | + | ?* | + | + |
| g_1^p | + | + | + | + | + |
| g_1^{np} | | | _ | + | + |
| π_1 | + | + | + | + | _ |
| x_1 | _ | + | _ | _ | + |
| $\overline{\tau}_{1}$ | + | _ | + | + | _ |
| -/0/+ | - if $\rho \rho_{1}$ | $_{N} S \frac{\delta_{3}}{\delta_{2}}$ | $\frac{(1+r)^2}{\Psi} +$ | $-\rho_N^2$ or | <i>Z'0</i> S |

Case 1: $\rho > 1 + r_1$ or $\rho_N > 0$

| | $\uparrow \overline{x}_2$ | $\uparrow \overline{x}_1$ | $\uparrow \overline{g}_2^{np}$ | $\uparrow \overline{g}_1^{np}$ | $\uparrow \overline{g}_1^p$ |
|---|---------------------------|---------------------------|--------------------------------|--------------------------------|-----------------------------|
| d_1 | _ | + | _ | + | + |
| g_1^p | 0 | 0 | 0 | 0 | $+^{**}$ |
| g_1^{np} | _ | | _ | + | 0 |
| π_1 | + | + | + | + | 0 |
| x_1 | _ | + | _ | _ | 0 |
| $\tau_{_1}$ | + | _ | + | + | 0 |
| $^{\ast\ast} \ g_1^p = \overline{g}_1^p.$ | | | | | |

Case 3: $\rho < 1 + r_1 \text{ or } \rho_N < 0$

| | $\uparrow \overline{x}_2$ | $\uparrow \overline{x}_1$ | $\uparrow \overline{g}_2^{np}$ | $\uparrow \overline{g}_1^{np}$ | $\uparrow \overline{g}_1^p$ |
|------------|---------------------------|---------------------------|--------------------------------|--------------------------------|-----------------------------|
| d_1 | — | ?*** | _ | ?*** | + |
| g_1^p | — | _ | _ | _ | + |
| g_1^{np} | — | _ | _ | + | _ |
| π_1 | + | + | + | + | + |
| x_1 | — | + | | | _ |
| τ_1 | + | _ | + | + | + |

*** +/0/- if
$$|\rho\rho_N| \leq \frac{\delta_3}{\delta_2 D \beta_G}$$
 or $0 \leq Z'O$.

Note: + indicates positive effect and - indicates negative effect.

As can be seen from Table 5.9, the nature of the effects of policy targets mainly depend on the gap between the benefits of productive public spending ρ and the costs of public borrowing $(1 + r_1)$ in t = 2; $\rho_N = \rho - (1 + r_1)$, where ρ_N is the net benefit of public spending in t = 2. Clearly, there are three cases;

(1) $\rho > 1 + r_1$ or $\rho_N > 0$ (when the net benefit of productive spending is positive in the next period; or there is a favorable or beneficial net effect);

(2) $\rho = 1 + r_1$ or $\rho_N = 0$ (when the net benefit of productive spending is zero in the next period; or there is no benefit or loss but break-even); and

(3) $\rho < 1 + r_1$ or $\rho_N < 0$ (when the net benefit of productive spending is negative in the next period; or there is an *un*favorable net effect).

First, lets consider the second case: $\rho_N = 0$, which is the *break-even case* since the benefits of productive public spending are *exactly offset* by the costs of borrowing in the next period. Under this scenario, equilibrium productive public spending is equal to its target level $(g_1^p = \overline{g}_1^p)$ and is fully financed by public borrowing. Thus, a rise in \overline{g}_1^p only raises public borrowing (d_1) and g_1^p but all else remains the same: $\partial \pi_1 / \partial \overline{g}_1^p = 0$, $\partial \tau_1 / \partial \overline{g}_1^p = 0$, $\partial x_1 / \partial \overline{g}_1^p = 0$, $\partial g_1^{np} / \partial \overline{g}_1^p = 0$, as can be seen from the middle panel of Table 5.9. Therefore, the rest of the comparative statics are the same as those of the previous section's model, which only embodies the debt dynamics (see Table 5.4). This is because, in this case, the benefits of productive public spending are exactly offset by the costs of financing it in the next period; thus, the net benefit of productive public spending on the next period's macroeconomic performance is zero. Furthermore, since productive spending is fully financed by public borrowing it does not affect the equilibrium values of non-productive public spending, the inflation rate, the tax rate and hence output in the current period.

When $\rho_N \neq 0$, the impact of productive public spending, such as infrastructure public investment, on the future macroeconomic performance would depend on the sign of ρ_N . For example, if the benefits of productive public spending are greater than the costs of borrowing ($\rho_N > 0$), then the net effect of productive public spending on the next period's macroeconomic performance is positive and hence favorable. Therefore, productive public spending in this case creates more than sufficient amount of resources in the next period to pay for its costs. Thus, the possibility of these future "excess" resources enables the policy maker to also expand current popular public spending financed by the additional borrowing. In other words, currently committed public investment would generate additional resources in the future that can be utilized to pay for the costs of borrowing arising from current period's non-productive public spending. As a result, a rise in non-productive (productive) public spending target, $\overline{g}_1^{np}(\overline{g}_1^p)$, raises non-productive as well as productive public spending, as can be seen from the upper panel of Table 5.9. This result seems to be counterintuitive, given our earlier result regarding the *intra*temporal trade-off between productive and non-productive public spending (see Section 3.3).²⁴ However, there is a reasonable explanation for this seemingly counterintuitive result. Under this scenario ($\rho_N > 0$), policy maker could alleviate the unfavorable effects of public borrowing arising from current period's non-productive public spending by investing in productive categories, such as infrastructure, education and health, which will generate "excess" resources in the next period to pay for the required borrowing. Furthermore, as it is evident from the upper panel of Table 5.9, while a rise in \overline{g}_1^{np} and \overline{x}_1 raises d_1 , a rise in \overline{x}_2 and \overline{g}_2^{np} may or may not lower d_1 ²⁵ This is again due to the net benefit of pro-

²⁴Recall that, a rise in \overline{g}_1^{np} (\overline{g}_1^p) decreases (raises) productive public spending in t = 1, due to the balanced-budget condition in the basic dynamic model (see Table 3.5).

²⁵Recall that there is not any ambiguity with respect to the effects of next period's policy targets on current period public borrowing, i.e. a rise in \overline{x}_2 and \overline{g}_2^{np} certainly lowers the d_1 (see Section 5.2). That is, while borrowing lowers the distortionary losses in t = 1, it raises the distortionary losses in t = 2 by requiring more distortionary taxes for financing the debt service arising from the borrowing in t = 1.

ductive public spending; additional resources created by productive spending may be utilized to pay for, at least *partly*, the costs of borrowing incurred by the financing of non-productive public spending in t = 1, and this alleviates the effects of distortions in t = 2.

When $\rho_N < 0$, the net effect of productive public spending on the next period's macroeconomic performance is unfavorable. In this case, productive public spending could not generate a sufficient amount of resources in the next period, not even to offset the costs incurred. Under this scenario, there exists a trade-off between productive and non-productive public spending in t = 1since they compete for the available resources (including public borrowing) just as in the balanced budget case analyzed in Chapters 3 and 4^{26} While a rise in non-productive (productive) public spending target, $\overline{g}_1^{np}(\overline{g}_1^p)$, raises equilibrium non-productive (productive) public spending it lowers equilibrium productive (non-productive) public spending, as it is evident from the bottom panel of Table 5.9. Moreover, as can be seen from Table 5.9, a rise in \overline{g}_2^{np} and \overline{x}_2 lowers d_1 , while a rise in \overline{g}_1^{np} and \overline{x}_1 may or may not raise d_1 .²⁷ However, a rise in \overline{g}_1^p definitely raises d_1 , since productive spending generates resources to pay at least some part of debt service resulting from the financing of it in t = 1. Hence, productive spending creates less distortions in t = 2 vis-a-vis non-productive public spending, which can not generate any resources in the next period.

Thus, the determinants of equilibrium productive public spending and public borrowing in t = 1 are formalized by the following two propositions.

Proposition 6 The higher the productive public spending target in t = 1 the higher is equilibrium productive public spending in that period. However, the

²⁶Note that, both productive and non-productive public spending compete for the available resources in the basic dynamic model, where balanced budget rule was assumed in each and every period (see Section 3.3).

²⁷It should be note that $\partial d_1 / \partial \overline{g}_1^{np}$ and $\partial d_1 / \partial \overline{x}_1$ are positive if and only if $|\rho \rho_N| < \frac{\delta_3}{\delta_2 D \beta_G}$. The more myopic the government (the lower the β_G) is the more likely is that $\partial d_1 / \partial \overline{g}_1^{np}$ and $\partial d_1 / \partial \overline{x}_1$ are positive.

effects of other current and future policy targets on equilibrium productive public spending in t = 1 depend on the net benefit of productive public spending, $\rho_N = \rho - (1 + r_1)$, in t = 2.

i)The higher are current and future output and non-productive public spending targets, the higher is equilibrium productive public spending in the first period, if and only if $\rho_N > 0$.

ii) A change in current and future output and non-productive public spending targets does not affect equilibrium productive public spending in the first period, if and only if $\rho_N = 0$.

iii) The higher are current and future output and non-productive public spending targets, the lower is equilibrium productive public spending in the first period, if and only if $\rho_N < 0$.

Proof. While the derivative of g_1^p with respect to \overline{g}_1^p is E, which is unambiguously positive for all values of ρ_N , the derivative of g_1^p with respect to $\overline{g}_1^{np}, \overline{x}_1, \overline{g}_2^{np}$ and \overline{x}_2 are $O, \frac{1}{\alpha}O, \frac{1}{(1+r)}O$, and $\frac{1}{(1+r)\alpha}O$, respectively, and $O \top O$ if and only if $\rho_N \top O$.

Proposition 7 The higher the productive public spending target in t = 1, the higher is the equilibrium public borrowing in t = 1. However, the higher are the non-productive public spending target and output target today, the higher is equilibrium public borrowing today, if and only if $\rho_N = 0$. Similarly, the higher are the non-productive public spending target and output target in future, the lower is the equilibrium public borrowing today, if and only if $\rho_N = 0$. That is, while the higher the \overline{g}_1^p the higher is the d_1 , the higher are $\overline{g}_2^{np}(\overline{g}_1^{np})$ and $\overline{x}_2(\overline{x}_1)$ the lower (higher) is the d_1 , if and only if $\rho_N \leq 0$ ($\rho_N = 0$).

Proof. The derivative of d_1 with respect to \overline{g}_1^p is $(B-1)Z\frac{\delta_3}{\delta_2}$, which is unambiguously positive. However, the derivative of d_1 with respect to \overline{g}_2^{np} and \overline{x}_2 are $(Z'0-1)\frac{1}{(1+r)}$ and $(Z'0-1)\frac{1}{(1+r)\alpha}$, respectively, which are unambiguously negative, if and only if $\rho_N \leq 0$. Similarly, the derivative of d_1 with respect to \overline{g}_1^{np} and \overline{x}_1 are Z'0 and $\frac{1}{\alpha}Z'0$, respectively, both of which are unambiguously positive, if and only if $\rho_N = 0$.

As the above propositions reveal the effects of current and future policy targets on equilibrium productive public spending and borrowing depend on the net effect of productive spending, ρ_N . As discussed in more detail in Chapter 4, in this framework government can control the value of ρ_N by controlling the value of ρ , through controlling the scale of the quality of productive public spending and amount of corruption and favoritism in the public sector (see Section 4.2.2 for more detail).

5.4 Capital Borrowing Rule

The previous analysis has established that, due to their *inter*temporal nature, public borrowing and productive spending influence the policy decisions and macroeconomic outcomes both in the current and the future periods. In other words, there is potential for strategic political behavior in the setting of both public debt policy and public spending policy.²⁸ Given the potential for strategic behavior various forms of borrowing rules have been proposed (see Section 2.3.2). For instance, several authors proposed a binding debt rule, e.g. balanced budget rule, in order to prevent strategic debt accumulation (see, for example, Dur *et al.*, 1998; and Persson and Tabellini, 2000 for an overview). However, Dur *et al.* (1998) states that underinvestment may result from a binding debt rule.^{29,30} In other words, such a rule shifts strategic manipula-

 $^{^{28}}$ As discussed before, the existence of electoral uncertainty may lead to short-sighted policies and associated strategic political behavior in the forms of excessive (strategic) debt accumulation and low level of productive public spending (see Sections 4.2.1 and 5.2.3).

²⁹This result was observed in many members of European Monetary Union. Such rules also have other drawbacks. For example, they may restrain stabilization policy. See Chapter 2 for more detail on the binding debt rules.

³⁰The previous results obtained from the basic dynamic model, where balanced budget condition (rule) is maintained, is consistent with this result (see Chapters 3 and 4).

tion by politicians from public borrowing to public investment (Dur *et al.*, 1998).

Nevertheless, as a solution to such strategic political behavior, several economists proposed other particular form of these rules: the capital borrowing rule. This rule, frequently referred to as the "golden rule" of public borrowing, enables the policy maker to run a deficit equal to the level of public investment committed and has been applied in many US states and Dutch municipalities (Dur et al., 1998). The fiscal policy framework that was recently adopted in the UK also features a similar borrowing rule.³¹ Moreover, the pros and cons of introducing a 'golden rule' within the fiscal framework of EMU in the European Union have also been debated intensely during the recent years (see, for instance, Ballassone and Franco, 2000). However, as discussed in more detail before, an understanding of the role of a capital borrowing rule on public investment and macroeconomic performance is also of paramount importance for the developing countries, given the fact that the productivity of public investment is expected to be high in these countries and the significant role of political instability on the public spending and borrowing decisions. Therefore, this section explores the effects of a simple capital borrowing rule on macroeconomic performance and strategic behavior. In other words, the previous section's analysis is extended by considering the following simple capital borrowing rule

$$g_t^p = d_t \tag{5.10}$$

This rule permits the policy maker to issue new debt exactly equal to the amount of public investment in the same period. Put it differently, policy maker could only run a budget deficit equal to the amount of productive

 $^{^{31}\}mathrm{However},$ both borrowing and investment spending requirements are defined over the cycle in the UK.

spending committed in that period. This also implies that balanced budget constraint applies for the non-productive spending, i.e. $g_1^{np} = \pi_1 + \tau_1$.

New equilibrium values under this capital borrowing rule are obtained by imposing the condition $g_1^p = d_1$. Table 5.10 contains the final period macroeconomic performance indicators when the borrowing decisions are made according to this rule.³²

Table 5.10 Output Gap, Public Spending Gap and Inflation Rate Under Capital Borrowing Rule

| $(\overline{x}_2 - x_2) = \frac{\delta_2}{\alpha} \Psi[\frac{1}{\alpha} \overline{x}_2 + \overline{g}_2^{np} - \rho_N g_1^p]$ |
|--|
| $\left(\overline{g}_2^{np} - g_2^{np}\right) = \Psi\left[\frac{1}{\alpha}\overline{x}_2 + \overline{g}_2^{np} - \rho_N g_1^p\right]$ |
| $\pi_2 = rac{2\delta_2}{\delta_1} \Psi[rac{1}{lpha} \overline{x}_2 + \overline{g}_2^{np} - ho_N g_1^p]$ |

Note:
$$g_1^p = d_1$$
.

As can be seen from Table 5.10, the effects of productive public spending committed in t = 1 on macroeconomic performance in t = 2 solely depend on the net benefits of productive public spending (ρ_N) , under the capital borrowing rule. Table 5.11 provides the comparative statics for the three cases of ρ_N considered before.

As it is evident from Table 5.11, under the capital borrowing rule, the effects of productive public spending in t = 1 on the macroeconomic performance in t = 2 depends on the net benefit of public spending, $\rho_N = \rho - (1 + r_1)$. Some of the issues highlighted by Table 5.11 can be summarized as follows:

• The higher is productive public spending in the first period the lower is the inflation rate, non-productive spending gap and output gap; hence, the better is the macroeconomic performance in the final period, if $\rho_N > 0$.

³²Equilibrium outcomes are derived as in Appendix J, by imposing the condition $g_1^p = d_1$.

- A change in productive public spending in the first period does not affect the macroeconomic performance in the final period, if $\rho_N = 0$.
- The higher is productive public spending in the first period the worse is macroeconomic performance in the final period, if $\rho_N < 0.^{33}$

Table 5.11 Comparative Statics in t = 2 (Capital Borrowing Rule)

| | $\uparrow \overline{g}_2^{np}$ | $\uparrow \overline{x}_2$ | $\uparrow g_1^p$ |
|------------|--------------------------------|---------------------------|------------------|
| g_2^{np} | + | _ | + |
| x_2 | _ | + | + |
| π_2 | + | + | _ |
| $	au_2$ | + | _ | + |

Case 1: $\rho > 1 + r_1$ or $\rho_N > 0$

Case 2: $\rho = 1 + r_1$ or $\rho_N = 0$

| | $\uparrow \overline{g}_2^{np}$ | $\uparrow \overline{x}_2$ | $\uparrow g_1^p$ |
|------------|--------------------------------|---------------------------|------------------|
| g_2^{np} | + | | 0 |
| x_2 | | + | 0 |
| π_2 | + | + | 0 |
| $	au_2$ | + | _ | + |

Case 3: $\rho < 1 + r_1$ or $\rho_N < 0$

| | $\uparrow \overline{g}_2^{np}$ | $\uparrow \overline{x}_2$ | $\uparrow g_1^p$ |
|------------|--------------------------------|---------------------------|------------------|
| g_2^{np} | + | | |
| x_2 | _ | + | _ |
| π_2 | + | + | + |
| $	au_2$ | + | _ | + |

Note: + indicates positive effect and - indicates negative effect and $g_1^p = d_1$.

³³Note that in all the three cases analyzed productive public spending committed in t = 1 definitely raises the next period's equilibrium tax rate in t = 2. This is due to the indirect beneficial effect of higher productive public spending (via output enhancing) on the tax base (see Section 3.3.2).

Recall that Buiter (1998) analyzed the role of a capital borrowing rule on government's solvency and fiscal stability. In that study, Buiter has shown that the effect of public investment on future primary (current) surpluses depends on the government's cost of borrowing *vis-a-vis* the cash rate of return on public investment (see Section 2.3.2 for more detail). The above results of this section are similar to that of Buiter's but also seems to extend the existing literature by providing insights for the role of a capital borrowing rule on the overall macroeconomic performance. That is, under the simple capital borrowing rule, the effects of productive public spending (e.g. public infrastructure spending) on future macroeconomic performance depend on the costs of public borrowing *vis-a-vis* the benefits of productive public spending.

To explore the implications of the capital borrowing rule on first period outcomes, Table 5.12 presents the equilibrium outcomes in t = 1.

Table 5.12 Equilibrium Macroeconomic Outcomes in t = 1 UnderCapital Borrowing Rule

| $g_1^p = \Phi[\frac{\Lambda}{\rho} \delta_2 \rho_N(\frac{\overline{x}_2}{\alpha} + \overline{g}_2^{np}) + \delta_3 \overline{g}_1^p]$ |
|---|
| $\pi_1 = rac{2\delta_2}{\delta_1} \Psi[rac{1}{lpha} \overline{x}_1 + \overline{g}_1^{np}]$ |
| $x_1 = Z\overline{x}_1 - rac{\delta_2}{lpha}\Psi\overline{g}_1^{np}$ |
| $g_1^{np} = \Psi[\phi \overline{g}_1^{np} - \frac{1}{\alpha} \overline{x}_1]$ |
| $	au_1 = rac{\delta_2}{lpha^2} \Psi \overline{g}_1^{np} - Z rac{1}{lpha} \overline{x}_1$ |

Note: $\Phi = \frac{1}{\delta_3 + \frac{\Lambda}{\rho} \delta_2 \rho_N^2}$, $g_1^p = d_1$, and other variables are as defined before.

From Table 5.12, one can see that when the committed productive public spending exactly matches the new debt issued, as is required under the simple capital borrowing rule, equilibrium output, unproductive spending, inflation and the tax rate in t = 1, are exactly the same as those of the centralized benchmark case (see Section 3.2), when public spending is all non-productive. This is due to the constraint that the policy maker in t = 1 could only run a budget deficit equal to the amount of productive spending committed in that period; as a result, unproductive spending is financed by the tax and seigniorage revenues only and thus, in effect, the balanced budget constraint still applies to the financing of non-productive spending, as noted before. Hence, the comparative statics for these variables are the same as those with the centralized benchmark case (see Section 3.2.2). As expected, however, the comparative statics of productive public spending depend on the net benefit of productive spending, ρ_N . Table 5.13 presents the comparative statics of productive public spending in t = 1 which can be interpreted as in the previous section.

Table 5.13 Productive Spending in t = 1: Comparative Statics (Capital Borrowing Rule)

Case 1: $\rho > 1 + r_1$ or $(\rho_N > 0)$

| | $\uparrow \overline{x}_2$ | $\uparrow \overline{x}_1$ | $\uparrow \overline{g}_2^{np}$ | $\uparrow \overline{g}_1^{np}$ | $\uparrow \overline{g}_1^p$ |
|---------|---------------------------|---------------------------|--------------------------------|--------------------------------|-----------------------------|
| g_1^p | + | 0 | + | 0 | + |

Case 2:
$$\rho = 1 + r_1$$
 or $(\rho_N = 0)$

| | $\uparrow \overline{x}_2$ | $\uparrow \overline{x}_1$ | $\uparrow \overline{g}_2^{np}$ | $\uparrow \overline{g}_1^{np}$ | $\uparrow \overline{g}_1^p$ |
|---------|---------------------------|---------------------------|--------------------------------|--------------------------------|-----------------------------|
| g_1^p | 0 | 0 | 0 | 0 | + |
| | | | | | |

*
$$g_1^p = \overline{g}_1^p$$

Case 3: $\rho < 1 + r_1$ or $(\rho_N < 0)$

| | $\uparrow \overline{x}_2$ | $\uparrow \overline{x}_1$ | $\uparrow \overline{g}_2^{np}$ | $\uparrow \overline{g}_1^{np}$ | $\uparrow \overline{g}_1^p$ |
|---------|---------------------------|---------------------------|--------------------------------|--------------------------------|-----------------------------|
| g_1^p | _ | 0 | _ | 0 | + |

An interesting question relating the presence of the capital borrowing rule is whether it would prevent strategic behavior in the making of public borrowing and productive spending decisions. As mentioned before, this has indeed been one of the main arguments put forward in favor of these rules. It is, therefore, of great interest to understand how policy makers would respond to electoral uncertainty when both the *beneficial* effects of public spending and the *detrimental* effects of public borrowing fall upon *uncertain* future policy makers. To this end, this section will also explore the role of electoral uncertainty on an incumbent government's productive public spending and public borrowing decisions when borrowing can only be raised to finance productive public spending categories as required by the simple capital borrowing rule. The resulting equilibrium productive public spending in the first period, prior to the elections, is as follows³⁴

$$g_1^{p,E} = \mathbf{\Phi}^* \left[\frac{\Lambda^*}{\rho} \delta_2 \rho_N \left(\frac{\overline{x}_2}{\alpha} + \overline{g}_2^{np} \right) + \delta_3 \overline{g}_1^p \right]$$
(5.11)

where superscript E denotes equilibrium outcomes under electoral uncertainty, $\Phi^* = \frac{1}{\delta_3 + \frac{\Lambda^*}{\rho} \delta_2 \rho_N^2}$, $g_1^{p,E} = d_1^E$, and other variables are as defined before.

Under the capital borrowing rule, the role of electoral uncertainty on productive public spending is summarized by the following proposition.

Proposition 8 Under the capital borrowing rule:

i) If productive public spending does not yield intratemporal utility to the incumbent government ($\delta_3 = 0$), electoral uncertainty does not affect the productive public spending in equilibrium.

ii) When productive public spending also yields intratemporal utility to the incumbent government ($\delta_3 > 0$),

a) the lower (higher) the incumbent's probability of re-election (p) the lower

³⁴The same modifications as in Section 4.2.1 is performed to this set-up. That is, we replace β_G with $\beta_G^* = p\beta_G$. As the elections will take place at the end of the first period, optimal policy outcomes in the final period will be the same as before.

(higher) the productive public spending in equilibrium if and only if $\rho_N > 0$ and

$$\delta_2(\frac{\overline{x}_2}{\alpha} + \overline{g}_2^{np}) > \rho_N \overline{g}_1^p,$$

b) the lower (higher) the incumbent's probability of re-election (p) the higher (lower) the productive public spending in equilibrium if and only if $\rho_N < 0$,

c) the electoral uncertainty does not affect the equilibrium productive public spending if and only if $\rho_N = 0$.

Proof. i) Provided that $\delta_3 = 0$, the derivative of $g_1^{p,E}$ with respect to p is zero.

ii) Provided that $\delta_3 > 0$, the derivative of $g_1^{p,E}$ with respect to p is

$$\frac{\beta_G D \delta_3 \rho_N \left[\delta_2 \left(\frac{\overline{x}_2}{\alpha} + \overline{g}_2^{np}\right) - \rho_N \overline{g}_1^p\right]}{(\delta_3 + \frac{\Lambda^*}{\rho} \delta_2 \rho_N^2)^2}$$

This derivative is positive if and only if $\rho_N > 0$ and $\delta_2(\frac{\overline{x}_2}{\alpha} + \overline{g}_2^{np}) > \rho_N \overline{g}_1^p$. It is zero (negative) if and only if $\rho_N = 0$ ($\rho_N < 0$).

This proposition suggest that the simple capital borrowing rule would certainly prevent strategic behavior if productive public spending does not provide utility to the incumbent government in the same period. When it does, whether electoral uncertainty would lead to strategic behavior depends on the sign of ρ_N . In other words, the capital borrowing rule may or may not prevent the strategic use of productive public spending even when it prevents strategic debt accumulation, as is the case here.

5.5 Conclusion

This chapter has analyzed the role of domestic public borrowing on public spending decisions and macroeconomic performance.

Policy makers face an *inter*temporal trade-off between current and future public spending. While borrowing raises current public spending, it lowers resources for future public spending. As a result, it has been shown that the higher public borrowing in the first period leads to higher inflation rate, public spending gap and output gap; hence, results in worse macroeconomic performance in the final period.

The previous chapter established that a high degree of political instability may lead to myopic policies and associated strategic behavior in the form of low levels of productive public spending. Similarly, this chapter has shown that a high degree of political instability may lead to myopic behavior in another form: excessive (strategic) debt accumulation. If the incumbent government faces a low probability of re-election at the end of the current period, it may accumulate excessive amount of public debt to tie the hands of its successor by restraining the resources available for public spending in the next period.

These results (as well as those of the previous chapter) may shed some light on Turkey's populist and myopic public spending and domestic borrowing policies of the late 1980s and the early 1990s, which are associated with unstable and polarized political environment. Furthermore, the above results may also shed some light on the restraining effects of Turkey's domestic debt service on public spending policies since the mid-1990s. However, it should be noted here that the public spending and debt dynamics of the Turkish economy over the late 1980s and the 1990s are realized under a special set of circumstances.³⁵ Therefore, given the simple contexts of the models of Part I, the aforementioned results could at most provide *partial* explanations to the certain aspects of the public spending and debt dynamics of the Turkish econ-

³⁵For instance, during the 1989-1993 period, Turkey had managed to maintain the populist policies - through the reliance on domestic borrowing - mainly with the help of capital inflows. Moreover, as noted before, banking sector have played an important role in public borrowing policies as the primary buyer of the government bonds and T-bills in the shallow market. This has been the main factor behind the significant rise in real interest rates during the 1990s.

omy during that period. This period of the Turkish economy will be analyzed in more detail in Chapter 7.

The interesting as well as original result is that the net effect of productive spending on the next period's macroeconomic performance depends on the benefits of productive public spending (ρ) relative to the costs of public borrowing $(1 + r_1)$. For example, when the benefits of public spending are exactly offset by the costs of borrowing in the next period the net benefit of productive spending committed in t = 1 on macroeconomic performance in t = 2 is zero. However, if the benefits of public spending are more than the costs of borrowing in the next period, then the net effect of productive public spending in t = 1 on macroeconomic performance in t = 2 is favorable. Productive public spending in this case creates additional resources to (partially) pay the costs of other forms of public spending, e.g. popular spending.

This chapter also considered the implications of a capital borrowing rule where only public investment could be financed by additional borrowing. The obtained results suggest that even under such a borrowing rule, higher productive public spending may yield unfavorable effects on macroeconomic performance in t = 2 if the returns from investment are low, for instance, due to low quality. In other words, qualitative as well as quantitative aspects of fiscal management matter for macroeconomic performance. In addition, it is shown that the capital borrowing rule does not necessarily prevent the strategic use of public investment, even though it prevents strategic debt accumulation.

Part II

Macroeconomic Instability, Capital Accumulation and Economic Growth: The Turkish Experience 1963-1999

CHAPTER 6

REVIEW OF THE LITERATURE ON THE ROLE OF PUBLIC INVESTMENT AND MACROECONOMIC INSTABILITY IN CAPITAL ACCUMULATION AND ECONOMIC GROWTH

6.1 Introduction

During the recent years, the role of public investment and macroeconomic instability in capital formation and economic growth were among the widely researched areas by the economists. It is, for instance, frequently argued that the role of state¹ as a provider of public investment complementary to private investment and stable macroeconomic environment, among the other roles,² are crucially important for sustaining growth in developing countries.

 $^{^1\}mathrm{The}$ terms "government" and "state" will be used interchangeably throughout this thesis.

²According to Nobel Laureate Joseph Stiglitz (1997), the governments of USA and the rapidly growing East Asian countries have played six important roles in their economic development. These are: promotion of education, investment in physical and institutional infrastructure, promotion of technology, support to financial sector, prevention of environmental degradation and creation and provision of a social safety net. Moreover, as documented by several studies, the role of governments have been very pivotal in East Asian countries during their rapid growth episodes (see, for example, Amsden, 1997 and World Bank, 1993 among many others).

Unfortunately, Turkey and many other developing countries have experienced endemic macroeconomic instability as a result of implementing unsound economic policies over long periods of time. Consequently, most of these countries suffering from endemic macroeconomic instability tend to exhibit low and volatile rates of private as well as public capital formation and economic growth.

The main objective of Part II is to investigate the effects of macroeconomic instability on public and private investment as well as on the nature of their relationships (e.g. complementarity) and economic growth in the Turkish economy over the 1963-1999 period. As discussed in more detail in Section 1.2.1 (Chapter 1), the principal aim of this part is to extend the recent work in the literature on the role of public capital spending in capital accumulation and economic growth, by including the issue of macroeconomic instability and by considering the Turkish experience. To this end, initially the present chapter provides a selective and condensed overview of the related literature.

The rest of this chapter is organized as follows. Sections 6.2 and 6.3 review the literatures on the role of public investment and macroeconomic instability in capital formation and economic growth, respectively. Section 6.4 provides a condensed overview of the Turkish evidence. Finally, Section 6.5 presents the road map for the rest of Part II.

6.2 The Role of Public Investment in Capital Formation and Economic Growth

In recent years, the literature on the role of public investment in capital formation and economic growth has been one of the active research areas for both developing and developed countries. Currently there are two related strands of research on the role of public investment in capital accumulation and economic growth. The first one focuses on the public capital spending³-private investment nexus. The second one analyzes the public capital spending and output (or growth) nexus. Sections 6.2.1 and 6.2.2 provide a review of these two strands of literature, respectively.

6.2.1 Public Capital Spending-Private Investment Nexus

Public investment is considered as one of the determinants of private investment in the public capital spending-private investment nexus literature. The following sub-section provides the formal explanation.

Theoretical Framework

Generally speaking, in this strand of literature, public investment is included as an explanatory variable along with other explanatory variables, such as real output,⁴ in the private investment function,

$$I_p = f(\mathbf{X}, I_g) \tag{6.1}$$

where I_p denotes private investment, I_g denotes public investment and **X** represents a set (vector) of other variables. The three conceptually different effects of public investment on private investment can be considered depending on the form of the relationship between public and private investment:

 $^{^3{\}rm The \ terms}$ "public investment" and "public capital spending" are used interchangeably throughout this thesis.

 $^{^4 \}mathrm{See}$ Agenor (2000) for a list of other determinants of private investment in the developing countries.

- if public investment and private investment are *complementary*; then, an increase in I_g, e.g. public investment in infrastructure, increases (*crowds-in*) I_p,
- if I_g and I_p are substitutes; then, an increase in I_g decreases (crowds-out) I_p ,
- and finally, if I_g and I_p are *unrelated*; then, an increase in I_g cannot affect I_p .

Nevertheless, one should also consider the *financial crowding-out effect* of public investment while determining its net effect on private investment. That is, an increase in public investment may lead to a reduction in private investment due to the unfavorable effects of government financing (e.g. borrowing) on the existing financial resources and/or on the interest rates.⁵ Therefore, both effects of public capital spending should be considered for a meaningful policy making.

Empirical Results

This section provides a selective overview of the empirical results in the public capital spending-private investment nexus literature, due to the existence of a vast research since the early 1980s. The analysis is performed under two headings: multi-country studies and country-specific studies.⁶

⁵Along the neoclassical lines, "traditional" crowding-out hypothesis states that an increase in public investment results in equal fall in private investment due to the effect of government borrowing (for financing its expenditure) on interest rate. This is "full" or complete financial crowding-out effect. However, an increase in public investment does not necessarily lead to full financial crowding-out effect. Its magnitude depends on the structure of economy (e.g. structure of the financial system).

⁶While the first group of studies are based on cross-section or panel data, the second group of studies are based on a single-country time series data.

Multi-Country Studies

One of the seminal studies in this literature is by Blejer and Khan (1984). This study attempted, for the first time, to analyze the effects of both infrastructural and non-infrastructural components of government expenditure on private investment. It is this characteristic which distinguishes this study from early studies (see, Blejer and Khan, 1984, for more detail on these earlier studies).

Their model on private investment is a variant of the flexible accelerator model which incorporates roles for both fiscal and monetary policies. And they estimated four different versions from pooled data on 24 developing countries. The infrastructural component has positive and significant value and the opposite is true for non-infrastructural component. This means that there is a significant crowding-in effect of infrastructural component. These results confirmed the *a priori* expectations.⁷ They have also emphasized that if estimation is done without distinguishing infrastructural component from noninfrastructural component, the results could be insignificant, as it is reported in their regressions and in many other cited studies (see, Blejer and Khan 1984).

Blejer and Khan (1984) explicitly state that the government should be careful in its decision on the components of public expenditure since it may either have positive (crowding-in) or negative effects (crowding-out).

More recent multi-country studies used panel data in their analyses. Cardosa (1993), for example, analyzed private investment in six Latin American Countries $(LACs)^8$ by using a regression analysis on quadrennial panel data

⁷However, the magnitudes of the coefficients are quite different. This is due to the fact that different approaches for calculating proxies (e.g. for infrastructural and non-infrastructural components) will result in different values, in different estimation results. This is explicitly emphasized by Blejer and Khan in their conclusion. See Blejer and Khan (1984) for more detail.

⁸These are : Argentina, Brazil, Chile, Colombia, Mexico and Venezuela. They represent more than 85% of all LACs' GDP.

for the 1970-85 period. Cardosa noted the complementarity between private and public investment and found that "[in]... regressions a one-percentage point increase in the share of public investment in GDP raises the share of private investment in GDP by more than a half percentage point" (Cardosa, 1993: 845). She further noted that "[t]his complementarity does not rule out the possibility that an increase in the budget deficit crowds out private investment" (Cardosa, 1993: 845) and found crowding-out effect but with insignificant coefficients. Due to this reason, Cardosa suggested tax-financing instead of domestic-debt financing. Moreover, Cardosa blamed the decline in private investment in LACs, as well as on other causes, such as macroeconomic instability.

A study by Argimon *et al.* (1997) investigates the relationship between government spending and private investment on a panel data of 14 industrialized OECD countries⁹ for the period 1979-1988. Their empirical results lend support to a crowding-in effect of infrastructure investment on private investment. Furthermore, while they found no considerable evidence on direct crowdingout of public investment, they found considerable evidence on crowding-out effect of public consumption.

A study by Ahmed and Miller (1997) examined the effects of disaggregated government expenditure namely, defense, education, health, social security and welfare, transportation and communication, on total investment (39 countries over the 1975-84 period).¹⁰ They used fixed-effect and random-effect (panel data) methods for investigating tax-financed and debt-financed government

 $^{^9 \}mathrm{See}$ Argimon et al. (1997: 1004, footnote no. 3) for the list of countries included in that study.

¹⁰Ahmed and Miller's study is quite different from the previous studies cited in this Section. Firstly, as mentioned above, their disaggregation of public expenditure is more specific compared to the previous studies. Secondly, they incorporated the government constraint into the regression equations; in order to analyze the effects of tax-financed and debt-financed government expenditure on investment. These two characteristics of the study are very important for the more sensitive and meaningful analysis of the government expenditures on investment.

expenditure for the samples of developing and developed countries, and also for the full sample of both groups.¹¹ They found that expenditure on social security and welfare crowds-out domestic investment in all samples. Another important result from this study is that expenditure on transportation and communication crowds-in investment in developing countries but not in developed countries. Ahmed and Miller stated that:

[o]ne possible explanation for this finding is that developing countries have not yet reached the threshold where further government expenditure on transportation and communication no longer adds to productivity and thus no longer encourages private investment. In contrast, developed countries have passed this threshold level (Ahmed and Miller, 1997: 8).

Agenor (2000) provides more evidence on the recent multi-country studies on developing countries.

Country-Specific Studies

USA

Aschauer (1989b) by using a neo-classical framework has investigated the effects of public capital spending on private investment.¹² Aschauer conducted his study on USA times series data (1953-86). He found that direct crowding-out effect of non-military public capital investment on private investment is outweighed by the (indirect) crowding-in effect; that is in his study the net effect is in favor of crowding-in effect. Consequently, Aschauer underlined the

 $^{^{11}\}mathrm{See}$ Ahmed and Miller (1997: 5, footnote no.3) for more detail on the countries included in these samples.

¹²As noted before, one of the earlier studies in the crowding-in, or more broadly, publicprivate investment nexus literature is the work of Blejer and Khan (1984); however, this literature has exploded with the pioneering work of Aschauer [Aschauer (1989b)].

importance of decomposing overall public expenditure into various categories and that it is inadequate to consider only the overall level of government expenditure. He emphasized the importance of this decomposition by giving an example:

it should not be supposed that a decision to cut \$50 billion from the defense budget and shift the funds to highway construction will have no effect on the economy, despite the fact that total government outlays are left unaltered. While this statement makes common sense, it is not reflected in current macroeconomic modelling practice (Aschauer, 1989b: 185-6).

Erenburg (1993) tried to test the neutrality proposition¹³ of the Rational Expectation School of thought, by using an econometric technique on the USA data over the 1947-1985 period. He stated that the previous studies either failed to validate or refute the neutrality proposition since they only focused on the demand-side of the public expenditure and not on the supply-side. Erenburg (1993) found a significant positive relationship between public and private investment and emphasized the importance of the decomposition of overall public expenditure. Erenburg (1993) stated that:

[i]f government provision of public capital enhances the marginal efficiency of private investment, the government sector investment should be viewed as an indirect subsidy to the private sector via infrastructure Erenburg (1993: 836).

Cote d'Ivoire

 $^{^{13}\}mathrm{According}$ to this proposition: unexpected (expected) government policy has (no) permanent effect on output.

During the 1980s, Cote d'Ivoire experienced a severe and long lasting financial and economic crisis. As a result, the Ivorian governments had resorted to successive structural adjustment programs. The major component of these programs was fiscal adjustment entailing public spending cuts, especially in public investment. However, Kouassy and Bohoun (1994) found a net crowding-in effect of public investment¹⁴ on private investment by using a "specific"¹⁵ growth model. They also performed simulations of alternative policies and found that the "best suited" policy lowers fiscal deficit and at the same time preserves the growth; for example, an increase in public investment can be accompanied by cuts in government consumption.

Some Other Developing Countries

In Taylor (1993),¹⁶ the following "simplified" private investment equation is estimated by the country papers' authors of this study:¹⁷ $I_p = I_o + \alpha I_g + \beta u$, where I_p and I_g are private and public investments normalized by potential output, respectively and u denotes the capacity utilization rate, i.e. u =actual output / potential output. Coefficient α captures crowding-in or crowding-out effect: if it is negative (positive) there is a crowding-out (crowding-in) effect.¹⁸ Coefficient β is used to capture an accelerator effect and I_o denotes the constant term. With the exception of the two countries, Chile and Colombia, values for α are positive and it ranges from -0.4 (Colombia) to 1.6 (Malaysia). For Turkey, the value of α is 0.185; that is, there is a crowding-in effect.¹⁹ This result will be analyzed in more detail in Section 6.4.

¹⁴They stated that there is a need for further disaggregation of public investment into infrastructural and non-infrastructural components since this would "shed more light on the location of positive effects of public investment" (Kouassy and Bohoun, 1994: 1125).

 $^{^{15}}$ See Kouassy and Bohoun (1994: 1120-3).

 $^{^{16}}$ Bacha (1990) and Taylor (1991) incorporated the crowding-in effect into the three gap analysis.

¹⁷See Taylor (1993) for additional information.

 $^{^{18}}$ Taylor's (1991) private investment equation is somewhat less "restrictive" than this one. See Taylor (1991) for more detail.

¹⁹See Taylor (1993: 28, Table 2.3) for additional information on α coefficient in other countries and β coefficient in all countries in the sample.

Agenor and Montiel $(1996)^{20}$ provides an overview of earlier studies on developing countries in this strand of literature. However, there are certain common problems, such as endogeneity and spuriousness of the results, in the early studies of this (as well as the other strand of) literature. These problems will be considered in Section 6.2.2.

Overall, the selective evidence (both from country-specific and multi-country studies) reported in this section lends support to the complementarity between public investment (especially in infrastructure) and private investment. However, early studies (reported in Agenor and Montiel, 1996 and Blejer and Khan, 1984) provided mixed results. The evidence on the Turkish economy is also ambiguous (see Section 6.4).

6.2.2 Public Spending-Output (Growth) Nexus

There are at least two channels through which public spending may affect the rate of economic growth. A rise in public spending, e.g. public investment, leads to an increase in capital stock; thus, output. Similarly, a rise in productive public spending, such as spending on education, health and infrastructure, raises overall productivity (as well as marginal productivity of privately owned inputs) and hence output. These mechanisms will be more formally considered below.

Theoretical Frameworks

Generally speaking, the role of public capital spending in economic growth can be theoretically analyzed both in a simple production function framework (Aschauer, 1989a) and in a new growth theory framework (Barro, 1990).

Barro (1990) is one of the seminal works in a new growth theory framework. Barro's model links government expenditure on infrastructure, which

 $^{^{20}}$ See also Blejer and Khan (1984).

is assumed to be complementary to private investment, to the growth process. In this model, firms' production functions include both private capital input and publicly provided capital (infrastructure).²¹ It is assumed that government maintains fixed proportion of public expenditure to output, which is totally financed by income tax due to balanced budget assumption. The main idea of this model is that when individual firms increase their production they increase overall output and income, thus, revenues of the government, which implies higher infrastructure and higher productivity for other firms. This is the externality effect of higher infrastructure. However, it should be mentioned that there is no "direct" government intervention to the economy, since there is a built-in process for the determination of public infrastructure. Furthermore, an increase in public infrastructure also has negative effects on growth, because it is financed by *distortionary* income tax that negatively affects the marginal productivity of capital. Therefore, Barro (1990) calculates the optimal tax rate which maximizes long run growth rate of the economy.²² However, Barro's (1990) model is not suitable for analyzing the effect of government spending in developing countries. Such balanced budget assumption is not plausible for developing countries as it is for developed countries. According to Strauss (1998), this is one of the drawbacks of the Barro's (1990) model since the government's taxation ability is limited in most developing countries. Furthermore, governments in many developing countries increasingly rely on seigniorage and public borrowing to finance their spending.

Besides Barro's (1990) model, there are other endogenous growth models on the role of public spending in economic growth.²³ More recently, David Aschauer has also worked with endogenous growth models (Aschauer, 1998). He examined the effects of different means of financing government expenditure on growth and inflation within an endogenous growth setting. One of his

²¹See Agenor (2000) for a simplified exposition of this model.

 $^{^{22}}$ It is equal to natural efficiency condition of the size of the government (Barro, 1990).

²³See Agenor (2000) for additional models on the role of public spending (including capital spending) in economic growth.

main findings is that "optimal public finance requires productive government expenditure to be financed by money creation and unproductive government expenditure by income taxation" (Aschauer, 1998: 1).

A widely used theoretical framework is the production function approach. In this framework public capital can be considered as a factor influencing total factor productivity and/or as an additional input in the production function. More formally,²⁴

$$Y = A(K_g)F(K_p, K_g, L)$$
(6.2)

where Y is the real output of private sector, A is the total factor productivity, L is the level of employment, K_p and K_g denote private and public capital stocks, respectively.²⁵

In practice, the following neoclassical production function framework is widely used to analyze the effects of a rise in public investment (or K_g) on output:

$$Y = F(L, K_p, K_g) + Z_y (6.3)$$

 $F_1, F_2 > 0, F_{11}, F_{22} < 0, F_{12} > 0$ $F_3 > 0, F_{13} > 0, F_{23} \Leftrightarrow 0$

where Z_y is a shift parameter of production function (e.g. related to the technology) and all the other variables are as defined before.

 $^{^{24}}$ A related but somewhat different approach is the growth accounting or sources of growth analysis. This approach also uses production function but public capital is not included as an input. See Sturm *et al.* (1998: 7) for more detail.

²⁵It should be noted that production function approach is criticized on theoretical grounds. For example, it is claimed that production function framework is inappropriate for analyzing the long run effects of public capital spending. (see, for example, Pereira, 2000; and Mittnik and Neumann, 2001 and the references therein).

In this framework, three conceptually different effects of an increase in public capital stock (K_g) on real output (Y) can be identified based on the relationship between K_p and K_g :

- (Case I) K_p and K_g are complementary: An increase in K_g will directly increase Y ($F_3 > 0$) and indirectly increase K_p and Y via increasing the marginal productivity of K_p ($F_{23} > 0$). It will also indirectly increase Yby raising the marginal productivity of L via increasing the availability of K_p and K_g per worker (F_{12} , $F_{13} > 0$). Overall, an increase in K_g will definitely increase Y.
- (Case II) K_p and K_g are substitutes: An increase in K_g will directly increase Y but it will also indirectly decrease Y (F₂₃ < 0); therefore the net effect on Y is uncertain. Y will decrease when the following condition holds: [(F₃ + F₁₃) + (F₂₃ − F₁₂)] < 0.
- (Case III) K_p and K_g are independent: An increase in K_g will (directly) increase **Y** but it will not affect K_p ($F_{23} = 0$).

Empirical Results

The empirical results in this strand of the literature is also vast and expanding. Therefore, this section will provide a selective overview. However, in line with the aim of Part II, this section will pay more attention to the country-specific time series analysis. Therefore, a summary of multi-country empirical analysis will be provided first.²⁶ Then, a review on the country-specific studies will be provided.

 $^{^{26}}$ According to Sturm *et al.* (1998), there are five ways of modelling government spending and economic growth at a macro level. These are: 1) production function approach, 2) behavioral approach, 3)VAR approach, 4)Barro-type (cross-section) regressions and 5) structural models. Sturm *et al.* comprehensively reviewed the literature and provided pros and cons of the five different approaches. However, it should be mentioned here that Sturm *et al.*'s classification is quite arbitrary since it includes both theoretical and empirical approaches.

Multi-Country Studies

Cross-section empirical studies are widely used in the multi-country analysis. Most of the empirical work related to the endogenous growth theory are comprised of Barro-type cross-section regressions.²⁷ Even though many studies have found positive effect of public investment on growth, the overall evidence is mixed (Agenor, 2000).²⁸ However, as indicated in Chapter 2, the favorable role of public infrastructure investment in economic growth is widely shared by many economists. For example, Easterly and Rebelo stated that "investment in transport and communication is consistently correlated with growth" (Easterly and Rebelo, 1993: 417). They also argue that the causality runs from public investment to growth rather than the other way round. By doing a cross-section regression analysis on developing countries, they found a high correlation (between .59 and .66) between transport and communication investment and per capita growth rate. Nevertheless, these cross-section studies were criticized on empirical grounds such as omitted variable, endogeneity and "fragility" (Munnel, 1992 and Sturm *et al.*, 1998).²⁹

Furthermore, cross-country analyses are also criticized by both development economists and macroeconomists since they are based on "representative" and/or "average" developing country assumption (see Temple, 1999: 150 and the references therein). That is, heterogeneity is an important factor for the developing countries; hence, country-specific empirical work on some issues may provide better insights into the analysis of economic growth (Gani, 1998 and Ericsson *et al.*, 2001). In this respect, time series (econometric) analysis

²⁷In this (empirical) approach public investment is added to the regression analysis as an explanatory variable. See, for instance, Barro (1989, 1991). Also see Levine and Renelt (1992) for a careful review of cross-section growth regressions.

 $^{^{28}}$ See Sturm *et al.* (1998) for the references of the other studies.

²⁹Omitted variable issue (problem) arises when a relevant variable is excluded from the empirical model. Endogeneity problem occurs, for example, when an endogenous variable is treated as an exogenous variable. Fragility occurs when estimate of the coefficient of a key variable significantly changes with the inclusion or exclusion of one or more other variable(s). See Munnel (1992) and Sturm *et al.* (1998) for more detail.

has become very important.³⁰

Country-Specific Studies

USA

Aschauer in his seminal work (Aschauer, 1989a) utilized a production function approach. He found that a "core" infrastructure (highways, airports, mass transit, street etc.) has strong explanatory power for productivity in United States. Aschauer estimated the elasticity for the core infrastructure, which accounted for 55% of non-military capital stock during 1949-85, as .24 (Aschauer, 1989a: 193). He also found a strong positive relationship between average annual labor productivity and public investment-gross domestic output ratios for the period 1973-85 for "G-7" countries (see Section 2.2).

Nevertheless, Aschauer and others³¹ obtained an estimate for the marginal productivity of public capital³² between -0.11 and 0.54. These results are criticized to be controversial results since the range of estimates were found to be large. Furthermore, Aschauer's results were considered to be very high by the critiques (Sturm *et al.*, 1998; and Aschauer, 1998).

There are also certain common problems in the early application of this approach with the single equation regression: the reverse causality (between Y and K_g), endogeneity (of K_g), and spuriousness of the results (i.e. due to the inclusion of stationary and non-stationary variables in the same empirical model).³³ Nevertheless, during the recent years many studies by utilizing modern time series techniques, such as vector autoregressions, have addressed

 $^{^{30}\}mathrm{Recent}$ progress in panel data techniques are also encouraging for growth studies (Temple, 1999).

³¹See Sturm *et al.* (1998) for the references.

³²Aschauer used a Cobb Douglas production of the form: $Y = A K_p^{\alpha} K_g^{\beta} L^{\varphi}$, where β represents the marginal productivity of public capital.

³³As it is rightfully emphasized in modern econometrics and time series econometrics, it is crucially important to consider the time-series properties of variables for obtaining sensible results. See, for example, Johnston and Dinardo (1997) and Franses (1998) for more detail.

these empirical critiques and found supportive empirical evidence on the favorable effects of public capital spending on private capital formation and output. These studies will be analyzed in more detail at the end of the current section.

Mexico

Ramirez (1998) has tried to deal with some of the above critiques in his study. He employed the following modified neoclassical production function:

$$Y = F(L, K_p, K_q, \mathbf{X}) + Z_y \tag{6.4}$$

where **X** represents a set (vector) of variables that early researchers included in the production function to explain the real output level (e.g. domestic credit to private sector, level of exports)³⁴ and all the other variables are as defined before. As mentioned above there are three conceptually different effects of an increase in K_g on Y depending on the form of relationship between K_p and K_g .

Since most of the developing countries lack "consistent" estimates for both private and public capital stock the direct estimation of equation (6.4) is not possible. However, researchers have overcome this problem by estimating the production function in the growth rate form. Therefore, percentage change in public (private) investment can be used as a proxy for the percentage change in public (private) capital stock.³⁵ Ramirez (1998) estimated the growth rateform of the equation (6.4) as a productivity growth³⁶ relationship for Mexico over the 1950-1990 period. In order to overcome the reverse-causation critique he used instrumental variable (IV) estimates. He also checked for cointegration and found one cointegration relation. In sum, Ramirez found that both public

 $^{^{34}\}mathrm{See}$ Ramirez (1998) for more detail.

³⁵Or, alternatively, ratio of public (private) investment to output can be used.

³⁶Ramirez obtained the figures for productivity growth by subtracting the percentage change in economically active population from the growth rate of output.
investment and private investment have significant effect on output.³⁷

Cameroon

Ghura(1997) analyzed the factors affecting economic growth in Cameroon during the 1963-96 period. He modified the Solow-Swan production function by following the implications of several endogenous growth models, which emphasize the importance of the roles of public and human capital in economic growth (Barro, 1990; and Lucas, 1988). More formally, Ghura employed the following production function,

$$Y = A K_p^{\alpha} K_a^{\beta} Z^{\gamma} \tag{6.5}$$

where Z = HL, H represents human capital development, and all the other variables are as defined before.

Thus, Ghura modified the Solow-Swan production function by incorporating K_g and H. By referring to equation (6.5), he noted that if we assume $\alpha + \beta + \gamma > 1$ (increasing returns to scale), endogenous type models are able to generate sustained growth from the factors endogenous to the economic system like human and physical capital accumulation via externalities. As in the analysis of Ramirez (1998), lack of "consistent" estimates for both private and public capital stock for Cameroon led Ghura to estimate the growth rate form of the above production function.³⁸

He found that the estimated aggregate production function for the Cameroon exhibits increasing returns to scale. Furthermore, increases in private investment, public investment, respectively increases economic growth rate of

³⁷In other study, Nazmi and Ramirez (1997) analyzed the impact of public and private investment expenditures on growth rate of Mexican economy (over the 1950-1990 period) by using simultaneous equation model. They found a positive effect of public as well as private investment on output. However, they noted a significant crowding-out effect of public investment on private investment.

³⁸Compared to Ramirez, Ghura used slightly different forms of proxy by making some assumptions. See Ghura (1997) for more detail.

Cameroon. Moreover, a progress in human developments, also contributes to economic growth. Prudent fiscal stance and economic policies aimed at increasing external competitiveness also help to spur growth.³⁹ Overall, according to Ghura, these results support endogenous-type growth model for Cameroon.

Country-Specific Studies Based on Vector Autoregressions (VARs)

The above recent studies, which are based on a single-equation analysis (Ramirez, 1998; and Ghura, 1997), have addressed some of the aforementioned empirical critiques (e.g. spuriousness) but not all (e.g. reverse causation). Fortunately, vector autoregression approach to the empirical modelling is a relatively less restricted approach with respect to the problems of reverse causation, endogeneity and time series properties of the data.⁴⁰ That is, the VAR approach is more data oriented and all variables are treated as jointly determined.

More recent studies utilized other modern multivariate time series techniques such as cointegration and impulse response analyses within the VAR framework. For example, cointegrated VAR (or vector error correction, VEC) models are more promising way for grasping and interpreting the relationships between public investment, private investment and output since they allow the determination of both short-run (as well as medium-run) dynamics and long-run relationships within the same framework.⁴¹ The importance of this flexibility with respect to short and long-run analyses is noted by Glomn and Ravikumar (1997: 199): "finding small short-run effects does not imply that public capital has no (long-run permanent) effect."⁴²

 $^{^{39}}$ He analyzed this by adding relevant variables to the empirical counterpart of the equation (6.5), see Ghura(1997) for more detail.

 $^{^{40}}$ See Sturm *et al.*(1998) for an overview of the pros and cons of this approach as well as a review of the earlier studies conducted with this approach.

⁴¹Economic theory plays two important roles in the development (or empirical specification) of error-correction models: 1) it suggests explanatory variables to be included and 2) it identifies the long-run relations between variables (Kennedy, 1998:267). See Section 8.2 for more detail.

⁴²Sometimes it takes 5-10 years to see the effects of public infrastructure investments. See Glomn and Ravikumar (1997) for references.

Ghali (1998), for example, by utilizing multivariate cointegration techniques, developed a vector error-correction (VEC) model⁴³ of growth to analyze the long-run effects of public investment (I_g) on private investment (I_p) and output (Y) in Tunisia over the 1963-93 period. Ghali referred to the neoclassical production function (equation (6.3)) in order to provide implications for the relationship between I_g and I_p from the relationship between K_p and K_g (as explained above).⁴⁴ Ghali used the Johansen Cointegration technique for testing and estimating long-run relationship for the three variables (I_p, I_g, Y) , and then (after finding one cointegration relationship)⁴⁵ formed vector error-correction (VEC) model of growth with these variables and analyzed the dynamics of the public-private capital formation in Tunisia. He found that "public investment is having a negative short-run impact on private investment and a negative long-run impact on both private investment and economic growth" (Ghali, 1998: 837).⁴⁶

Ghali (1998) used his reported short-run coefficients (from the VEC model) and the results of the Granger-causality tests in his evaluation of the shortterm dynamics and the resultant implications. However, Kulshreshtha and Nag (2000) criticized Ghali's (1998) study for being inadequate on methodological grounds, especially on the analysis of short-term dynamics. As a result, they stated that author's conclusion on short-term dynamics should be treated by caution.⁴⁷ Moreover, by referring to Pesaran and Shin (1998), they suggested that "[t]he plausible structures or short-run dynamics could be

 $^{^{43}}$ See Sturm *et al.*(1998) and Glomn and Ravikumar (1997) for the results of the early studies under this approach, i.e. VEC framework.

⁴⁴However, it should be noted here that Ghali implicitly assumed that I_g and I_p are the proxies for K_p and K_g , respectively, but this does not seem to be valid, at least in the production approach framework (see Ramirez, 1998; and Ghura, 1997).

⁴⁵This long-run relationship is: $Y = -1.7I_g + 2I_p$. He found a positive (negative) effect of $I_p(I_g)$ on Y.

⁴⁶Similarly, Ghali and Al-Shamsi (1997) have formed VEC model for United Arab Emirates to analyze the role of fiscal policy in economic growth process. Their analysis lend support to the importance of decomposition of public spending. That is they found positive (negative) effect of an increase in public investment (consumption) on economic growth.

⁴⁷See Kulshreshtha and Nag (2000) for more detail.

studied by innovation accounting tools such as impulse responses and error variance decompositions" (Kulshreshtha and Nag, 2000: 582).

More recently, Pereira (2000) and Mittnik and Neumann (2001), by utilizing innovation accounting tools, found positive effects of public capital spending on private investment and output. Pereira (2000), for example, investigated the effects of public investment on private sector's output in the USA (1956-1997) by using a VAR approach. He found that all types of public investment, including total as well as core infrastructure investments, have positive (crowding-in) effects on private investment and output. Similarly, Mittnik and Neumann analyzed the effects of total public investment on private investment and output by examining the impulse responses derived from the cointegrated VAR models, which are estimated by using the data from six industrial countries.⁴⁸ One of their main findings is that there is a strong evidence for complementarity between public and private investment. Furthermore, they found a positive effect of public investment on output.

6.3 The Role of Macroeconomic Instability in Capital Accumulation and Growth

Inflation rate is usually utilized as the proxy measure of macroeconomic instability. For instance, according to Fischer (1993b: 487), inflation rate is the best single indicator and "serve as an overall ability of government to manage the economy." Nevertheless, a rise in macroeconomic instability means a rise in one or more policy-induced macroeconomic instability indicators, such as public deficit to GNP ratio, external debt to GNP ratio, as well as inflation rate. This definition is in line with Fischer (1993a,1993b) and Bleaney (1996)

⁴⁸These are: Canada, France, UK, Japan, Germany and the Netherlands. See Mittnik and Neumann (2001) for more detail on the data period.

among many others, and will be used throughout this study.⁴⁹

It is commonly shared by many economists that macroeconomic instability is detrimental to economic growth (Kormendi and Meguire, 1985; Fischer, 1993a, 1993b; and Bleaney, 1996).⁵⁰ Moreover, many economists believe that chronic macroeconomic instability may lead to a low level of foreign direct investment, worsening of income distribution and poverty.

There are a variety of channels through which macroeconomic instability may affect the rates of capital formation and economic growth. These channels will be explained in Section 6.3.1 below. Then, Section 6.3.2 provides the review of the related empirical evidence.

6.3.1 Theoretical arguments

Theoretical arguments in this line of research focused on the detrimental effects of macroeconomic instability on *private* investment and productivity; thus on economic growth. For instance, it is widely argued that macroeconomic instability adversely affects the rates of productivity and investment mainly by creating uncertainty about current and future macroeconomic environment. More formally, a rise in the level of macroeconomic instability, i.e. an increase in inflation (and its variability),⁵¹ via creating macroeconomic uncertainty and distorting information, would adversely affect economic growth at least through the following mechanisms (Fischer, 1993b and Agenor, 2000):

• uncertainty reduces the efficiency of price system, which will in turn reduce both the level and the rate of productivity,

⁴⁹Consistent with this definition, macroeconomic instability index is developed in the next chapter for empirical purposes.

⁵⁰World Bank (1993), for example, argued that stable and sensible macroeconomic policies promoted the economic growth in East Asian Countries.

⁵¹Empirically, it is true that a rise in the level of inflation also rises its variability and its predictability. See Romer (2001: 522) for an overview and for evidence.

- temporary uncertainty also reduces the rate of private investment, by generating option value of waiting,⁵² i.e. "potential investors wait for resolution before committing themselves" (Fischer, 1993b), and reducing expected profit,⁵³
- uncertainty increases capital flight and this lowers capital accumulation.

Nevertheless, these channels are more relevant to *private* investment and productivity. Macroeconomic instability may also have negative effects on *public* investment but via different channels. While a rise in macroeconomic uncertainty is the main cause of a reduction in private investment, the reduction in the fiscal (as well as political) "ability" of the government is the principal reason for the decrease in public investment. That is, a rise in the level of macroeconomic instability leads to (or aggravates) fiscal stringency due to the existence of the budget constraint of the government. For example, high inflation rate and/or excessive debt accumulation lowers the overall public resources otherwise available for public expenditures, namely capital and current expenditures, at least through the following channels:

- On the one hand, a rise in inflation rate usually raises the degree of dollarization and results in a loss of seigniorage revenue, by reducing the demand for domestic currency.
- Furthermore, high inflation rate also lowers the revenues from ordinary taxes due to the Olivera-Tanzi effect.
- On the other hand, high indebtedness leads to a high debt burden (principal plus interest payment) and lowers the overall public resources available for other public expenditures, including public investment.

 $^{^{52}}$ See Fischer (1993b: 486-90) for more detail and the references.

 $^{{}^{53}}$ See Agenor (2000) for more detail.

Hence, a rise in the level of macroeconomic instability or the existence of chronic instability lowers the public resources via these channels. In turn, the incumbent government lowers public capital expenditures rather than current expenditures when she is faced with fiscal stringency since it is politically easier to cut the former than the latter (Roubini and Sachs, 1989b). This view is widely shared by many economists and there is empirical evidence that supports it.⁵⁴ Moreover, in the case of politically unstable and polarized environment, there are more incentives for the incumbent government to cut public investment rather than current spending (see Chapter 2 for an overview of the effects of political instability and polarization on public spending decisions and related empirical evidence).

Given the detrimental effects of macroeconomic instability on public investment, there seems to be an additional (albeit indirect) link between macroeconomic instability and economic growth due to the possible complementarity between public and private investment. Thus, macroeconomic instability can be very costly in terms of private capital accumulation and hence economic growth if public and private investment are complementary.

Quite recently, the role of exchange rate variability on investment has drawn the attention of the economic policy makers as well as researchers.⁵⁵ For example, it is argued that a rise in the exchange rate variability, by creating uncertainty, may lead to a fall in the level of investment (see, for instance, Byrne and Davis, 2003, for an overview of the relevant literature and for empirical evidence). Exchange rate variability may also lead to a high degree of dollarization and hence result in a loss of seigniorage revenue (see Agenor,

⁵⁴See, for example, De Haan *et al.* (1996) for an overview and empirical evidence.

 $^{^{55}}$ Early studies on the role of macroeconomic stability in capital accumulation have also noted the importance of sensible and stable exchange rate policies. For example, Fischer (1993a) pointed out that exchange rate overvaluations would harm the economy. He suggested that the black market exchange rate premium can be used as a proxy indicator. However, he also indicated that external debt to GNP ratio could be used as an indicator of the exchange rate overvaluation(s) (Fischer, 1993a: 14).

2000, for more detail. Also see Bahmani-Oskooee and Domac, 2002, for the Turkish experience).

6.3.2 Empirical Evidence

This section selectively reviews the empirical evidence on the role of macroeconomic instability in capital formation and growth. An overview of multicountry empirical analysis will be provided first. Then, a review on the country-specific studies will be provided.

Multi-Country Studies

Fischer (1993a) conducted cross-section analysis over the 1970-85 period and provided case studies for Cote d'Ivoire and Chile to analyze the role of macroeconomic instability in economic growth. Conclusion of his study is,

[p]rovided that inflation rate, external debt, and government deficit are accepted as macroeconomic policy indicators, both the cross-sectional regressions and the case studies support ... that a country's macroeconomic policy matter for long-run growth (Fischer, 1993a: 32).⁵⁶

Bleaney (1996) provided additional cross-section (1980-90) evidence for developing countries which supported the earlier studies. His conclusion is that a good macroeconomic management (or macroeconomic stability) is associated with higher rate of economic growth, for a given level of investment. However, he noted that "[i]t is less clear that the volume of investment is significantly affected" (Bleaney, 1996: 461).⁵⁷

⁵⁶Similarly, Fischer (1993b) used a regression analog of growth accounting, which is a production function based approach, in his other analysis. His conclusion is the same.

⁵⁷It should be noted here that those critiques on the cross-section studies mentioned in the previous sections (omitted variable, endogeneity and "fragility") are also applicable to the above studies. Recall that "representative" and/or "average" developing country assumption of cross-section studies is also criticized.

Cardosa $(1993)^{58}$ found some evidence of negative effect of economic instability⁵⁹ on private investment in Latin America, by using a regression analysis on quadrennial panel data for the 1970-85 period.

Country-Specific Studies

Spain

The Sanchez-Robles (1998) study appears to be the first study that has used the cointegration technique for studying macroeconomic stability and growth (with the exception of the studies on inflation and growth).⁶⁰ According to Sanchez-Robles (1998), the "degree of macroeconomic stability in a country is not an easily quantifiable concept; Fischer (1993[b]) selects some indicators (inflation rate, public deficit...) that could be used as proxies of instability in the empirical analysis" (Sanchez-Robles, 1998: 587). Sanchez-Robles employed single-equation cointegration analysis for Spain for the 1962-95 period, by using per capita income growth rate as dependent variable and has used each of the proxies for instability separately as a regressor, including constant and investment-to-income ratio, in various estimations. By treating these estimation results as empirical regularities, he concluded that macroeconomic stability should be regarded as a prerequisite for economic growth in the Spanish economy.

USA

Paul and Biswal (1998) investigated the various direct and indirect routes between macroeconomic factors, including the proxies, such as budget deficit and inflation, identified by Fischer (1993b), and economic growth by using VAR technique with the quarterly USA data (1967-1991). They found that the conventional macroeconomic variables (including Fischer's proxies), compared

 $^{^{58}}$ See the previous section for more detail.

⁵⁹For this purpose Cardosa developed a simple index of stability by simply adding the log of (1 + inflation rate), log of debt ratio and log of the coefficient of variation of real exchange rate (Cardosa, 1993: 843).

⁶⁰See Briault (1995) for an overview.

to the variables identified by the endogenous growth theory, seems to have greater effect on the economic growth rate of US economy.

Developing Countries

Agenor (2000) provides additional supporting evidence for developing countries.⁶¹

Finally, it is worthwhile to note that the above mentioned empirical studies, which assessed the effects of macroeconomic instability on investment, either used aggregate investment (see, for example, Bleaney, 1996) or private investment data (see, for example, Cardosa, 1993) in their analyses. In other words, those studies assessed the effects of macroeconomic instability on private or total investment but not public investment. This issue will be considered in more detail in Chapter 8.

6.4 Turkish Evidence: An Overview

This section provides a condensed and selective overview of the recent Turkish evidence on the role of public investment and macroeconomic instability in capital formation and economic growth.

The evidence on the nature of the relationship between public investment and private investment is ambiguous in the Turkish economy (see, for example, Anand *et al.*, 1990; Boratav and Turel, 1993; Celasun and Tansel, 1993; Conway, 1990). In other words, some studies found complementarity (crowding-in) effect (see, for example, Boratav and Turel, 1993), but some other researchers found inconclusive or contradictory results (see, for example, Celasun and Tansel, 1993).⁶²

⁶¹Also, see Agenor (2000) for a related empirical literature which analyzes the role of uncertainty, by using recent time-series techniques (e.g. GARCH models), on macro variables, such as output.

⁶²See Akinci (1993) for an overview of the earlier evidence (i.e. prior-to 1993).

The study by Boratav and Turel (1993) used the following "simplified" model of private investment $(Ip = I_o + \alpha Ig + \beta u)^{63}$ developed by Taylor (1993) and estimated it on time-series data from the period 1973 to 1990. They found a positive value of 0.185 for the coefficient α .⁶⁴ This means that an increase in public investment crowds-in private investment in Turkey.⁶⁵

Celasun and Tansel (1993) estimated a private investment model which is a modified version of accelerator model over the period 1972-1988.⁶⁶ They found that:

The signs for public investment variables show that lagged level of public investment tends to crowd in, while the change in its level tends to crowd out private investment, but their estimated coefficients are not significant (Celasun and Tansel, 1993: 288).

More recent studies have used modern time series techniques, such as cointegration analysis and decomposition (filters) techniques, on more recent data. However, the evidence on the nature of the relationship between public and private investment is again mixed (see Saygili, 1998; Uygur, 1995; and Metin-Ozcan *et al.*, 2001). Metin-Ozcan *et al.* (2001), for instance, found some evidence of crowding-in effects on private investment and output in Turkey (over the 1969-1998 period) but they pointed out the detrimental effects of domestic debt financing after 1989, due to a rise in interest rates, on those crowding-in effects of overall public investment.

Generally speaking, there is some evidence of a negative effect of macroeconomic instability on private capital accumulation and output in Turkey.

⁶³See Section 2.2.2 for more detail on this private investment model.

 $^{^{64}}$ The results are reported in Taylor (1993: 28, Table 2.3).

⁶⁵However, it should be noted that the above mentioned private investment model is very simple compared to the other models that have been mentioned in Section 6.2.

⁶⁶Note that this sample period is not significantly different from that of Boratav and Turel (1993).

Related studies have usually analyzed the effects of a single macroeconomic instability indicator. For example, there is a considerable evidence of a negative effect of inflation on private investment in Turkey (see, for example, Celasun and Tansel, 1993; Conway, 1990; and Uygur, 1995). Moreover, there is also evidence on the negative effects of budget deficits and external debt services on private investment and/or growth (see, for example, Saygili, 1998; and Karagol, 2002).

6.5 A Road Map for the Rest of Part II

This chapter has selectively reviewed the related literatures of Part II. The remainder of Part II is organized as follows. Chapter 7 provides a condensed overview of public spending dynamics, macroeconomic instability, investment and growth processes in the Turkish economy over the 1963-1999 period. Finally, Chapter 8 investigates the empirical relationships between macroeconomic instability, public investment, private investment and output in Turkey for the 1963-1999 period by using modern time series techniques.

CHAPTER 7

AN OVERVIEW OF MACROECONOMIC INSTABILITY PROCESSES, PUBLIC SPENDING, INVESTMENT AND GROWTH DYNAMICS IN THE TURKISH ECONOMY, 1963-1999

7.1 Introduction

Chronic instability, populist cycles, recurrent crises and associated low and volatile growth rates have been the dominant macroeconomic themes in the recent history of the Turkish economy.

Overall, the macroeconomic environment of the Turkish economy was quite stable during the 1960s. However, since the mid-1970s macroeconomic instability has steadily increased and has become an endemic problem for the Turkish economy, not to mention the two severe economic crises (in 1978-9 and 1994) that the economy experienced during the 1963-1999 period.¹ Since the late

¹During the 1960s Turkey's annual inflation rate, which is a rough indicator of the level of macroeconomic instability, was in line with that of developed countries. However, starting from the mid-1970s Turkey has experienced high and volatile inflation rates. Annual inflation rate rose from 5.2% in the 1960s to 27% in the 1970s, 50.4% in the 1980s and 73.2% in the 1990s.

1970s the elected governments generally followed unsound economic policies, such as myopic and populist macroeconomic policies, over extended periods of time. In turn, the resultant fiscal imbalances and high inflation have been followed by major economic crises. Several stabilization programs were implemented (usually after crises) to restore the stability in the economy but, mainly due to political reasons, the elected governments after seeing a temporary relief in the economy generally delayed or completely abandoned the stabilization policies. Furthermore, these governments as well as their successors usually chose to continue the popular and myopic economic policies with the aim of alleviating distributional pressures and hence preserving or increasing electoral support. Consequently, the insistence on unsound and unsustainable policies for long periods of time lead to persistently high and inefficient budget deficits, excessive debt accumulation, and high inflation rates. Hence, the Turkish economy became vulnerable to recurring crises that hit the economy via bitter economic contraction and ensuing fiscal adjustment. Similar arguments are also highlighted in a recent study by Onis (2002),

Turkey's performance in the economic and political realms is heavily interrelated. The performance of the democratic regime has clearly been inadequate in terms of generating high rates of economic growth on a sustained basis. What seemed to underlie this inadequate performance was the failure in terms of effectively managing the severe distributional conflicts, with different groups in society aiming to obtain a greater share of the "rents" associated with easy access to state resources. ... Indeed, "populist cycles" and periodic fiscal crises of the state have emerged as persistent features of the Turkish economy ever since the Menderes era of the 1950s. Democratically elected governments have typically initiated populist cycles in order to establish broad electoral support. ... The endemic nature of populist cycles clearly highlights the weaknesses of Turkish democracy in providing effective governance of the economy. Populist cycles and the ensuing crises have [been] costly in the sense that they have reduced the rate [of] growth below what would otherwise have been the case. Moreover, in a rather ironic and yet typical Latin American fashion, populist cycles have been associated with high rather than low inequality (Onis, 2002: 1-2).

The main aim of this chapter, therefore, is to provide an overview of the Turkish economy for the 1963-99 period, by analyzing macroeconomic instability processes, public and private capital formation and growth dynamics, as well as their relationships. Additionally, this chapter investigates the effects of macroeconomic instability processes on public spending dynamics, with special emphasis on public investment dynamics. In line with these purposes, this chapter also develops and utilizes the macroeconomic instability index (MII). Furthermore, this chapter also provides a descriptive analysis on the link between political instability and public spending and domestic borrowing dynamics during the last two decades.

The structure of the Turkish economy during the pre-1980 (inward-oriented) period and the post-1980 (outward-oriented) period are crucially different. Therefore, this chapter provides an overview of the Turkish economy for the two sub-periods. Accordingly, the remainder of this chapter is organized as follows. Section 7.2 and 7.3 provide the descriptive analyses for the inward-oriented period and the outward-oriented period, respectively. Finally, Section 7.4 provides the conclusion.

7.2 The Inward-Oriented Period, 1963-1979

From 1963 to 1979, Turkey followed an inward-oriented growth strategy. During this period the state played a crucial role in the economy by following import substitution policies and economy-wide planning with five-year development plans and annual programs (e.g. for investment) prepared by the State Planning Organization (SPO).²

Besides the trade restrictions and financial repression policies (e.g. regulated interest rates), the state had also made use of a heavy public investment, especially in manufacturing sector to promote industrialization and economic development. The State Economic Enterprises (SEEs) as the producer of intermediate manufacturing goods (for both the private sector and the other SEEs) were the main instruments of the industrialization strategy under inwardoriented growth strategy.

Given this brief summary on the structure of the Turkish economy during the inward-oriented period, a review of macroeconomic instability processes, capital formation and economic growth dynamics will be provided next. For this purpose, Table 7.1 presents summary information on the Turkish economy for the inward-oriented period (1963-1979). It also provides the same information for the outward-oriented period (1980-1999) and the whole period (1963-1999) for the sake of comparison and for the analyses in the next section.

Overall, Turkey attained a moderately high rate of growth and a rapid rate of capital accumulation during the inward-oriented period. Real GNP grew at an annual rate of 5.6%, on average. Similarly, while real private investment increased at an annual rate of 9.6%, real public investment increased at an annual rate of 10.7%, on average.³

However, Turkey's growth and investment performances were even more impressive during the pre-crisis era (1963-77) of the inward-oriented period.

²It should be noted that the inward-oriented strategy dates back to the 1930s (see, for example, Celasun and Rodrik, 1989 and Senses, 1991). However, this strategy was implemented formally after 1962, with economy-wide planning.

³It should be noted that during the last two decades investment series have been revised several times in Turkey (see, for example, Conway, 1990). The results in this chapter and in the next chapter are reported based upon the most recent series of the SPO (see the data appendix, Appendix K, for more detail).

| | 1960s | 1970s | 1980s | 1990s | 1963-99 | 1963-79 | 1980-99 |
|--|-------|-------|-------|-------|---------|---------|---------|
| I. Output and Capital Formation | | | | | | | |
| I.A Average Annual Growth Rate(%)* | | | | | | | |
| Y (real)** | 5.9 | 4.4 | 5.3 | 4.0 | 4.4 | 5.6 | 4.6 |
| Ip (real) | 11.9 | 4.9 | 10.0 | 6.1 | 6.1 | 9.6 | 9.0 |
| Ig (real) | 12.1 | 10.3 | 1.4 | 1.2 | 4.2 | 10.7 | 0.7 |
| Igi (real) | 12.5 | 12.7 | 5.1 | -0.3 | 5.8 | 12.4 | 1.0 |
| Igni (real) | 11.9 | 8.8 | -2.2 | 2.7 | 3.0 | 9.7 | 0.5 |
| I.B Ratios(%)*** | | | | | | | |
| Ip/Y (current)** | 11.5 | 15.3 | 12.8 | 18.1 | 14.7 | 13.8 | 15.4 |
| Ig/Y (current) | 5.9 | 7.6 | 8.8 | 6.2 | 7.2 | 6.9 | 7.5 |
| Ip/Y (real) | 10.5 | 14.8 | 11.8 | 18.4 | 14.1 | 13.0 | 15.1 |
| Ig/Y (real) | 6.7 | 9.7 | 9.9 | 6.6 | 8.4 | 8.5 | 8.3 |
| I.C Composition of Public Investment (%)*** | | | | | | | |
| Igi/Ig (current) | 34.3 | 39.4 | 50.5 | 50.5 | 44.4 | 37.3 | 50.5 |
| Igni/Ig (current) | 65.7 | 60.6 | 49.5 | 49.5 | 55.6 | 62.7 | 49.5 |
| II. Macroeconomic Stability | | | | | | | |
| MII*** | 0.040 | 0.149 | 0.436 | 0.591 | 0.326 | 0.104 | 0.514 |
| INF*** | 5.2 | 27.0 | 50.4 | 73.2 | 41.7 | 18.1 | 61.8 |

Table 7.1 Selected Indicators on the Turkish Economy, 1963-1999

* Average Annual growth rate over a period of time refers to the compound rate of growth computed from the estimated slope coefficient of the constant growth model: $\ln X_t = a + b$ trend $+ u_t$, where X_t is the variable of interest, ln denotes natural logarithm, trend = 0, 1, 2, ..., u_t is the disturbance term and (b * 100) gives the *instantaneous* (at a point in time) rate of growth, %. This model can be estimated by OLS (i.e. by regressing ln X on trend). The *compound* (over a period of time) rate of growth, %, can be calculated by taking the antilog of the estimated slope coefficient, subtracting 1 from it, and multiplying the result with 100. See Gujarati (1995: 169-171) for more detail.

Also note that 1960s=1963-70, 1970s=1970-80, 1980s=1980-90, 1990s=1990-99.

** Current = in current prices and Real = in 1994 prices

*** Decade averages: 1960s=1963-69, 1970s=1970-79, 1980s=1980-89, 1990s=1990-99.

Note: Y=GNP, Ip=Private Fixed Investment, Ig=Public Fixed Investment, Igi=Public Core-Infrastructural Fixed Investment, Igni=Public Non-Core Infrastructural Fixed Investment, MII=Macroeconomic Instability Index, DEF= GNP Deflator, INF = Inflation Rate (%-age change in DEF).

Source: See Appendix K.







Figure 7.2 Real Private Investment, 1963-1999



Figure 7.3 Real Public Investment and Its Infrastructural Component, 1963-1999

Turkey enjoyed a high rate of growth, real GNP grew at an average annual rate of 5.9% during this period. Furthermore, as can be seen from Figure 7.1, which provides the time plot of real GNP for the whole period, Turkey also attained relatively more steady rise in its real GNP in the 1963-77 period compared to the 1977-1999 period. Moreover, while real private investment increased at an average annual rate of 10.8%, real public investment increased at an average annual rate of 11.4% from 1963 to 1977.⁴ Figures 7.2 and 7.3 provide the time plots of real private and public investment, respectively, for the whole sample period. Comparison of these two figures reveals that public and private investment moved or "wandered" together from 1963 to the late 1970s, implying complementarity (crowding-in effect), which is in line with the aim of the inward-oriented strategy.

From 1973 to 1977, Turkey experienced an unprecedented growth in investment, led by public sector investment, mainly in manufacturing and transportation sectors.⁵ While public investment grew at an unprecedented annual rate of 22.1%, private investment grew at a more moderate rate of 10.2% per year, on average, during this period. Similarly, public (private) investment-GNP ratio (in current prices) rose from 6.3% (15.9%) in 1973 to 10% (17.2%) in 1977 (see also Figures 7.4 and 7.5).⁶

As mentioned in Chapter 6, inflation rate is usually utilized as the proxy measure of (policy-induced) macroeconomic instability. However, the previous chapter defined macroeconomic instability in more general way by utilizing other policy-induced macroeconomic instability indicators, such as public deficit to GNP ratio, external debt to GNP ratio, in addition to inflation rate. In line with this definition, this chapter develops⁷ and utilizes the macroeconomic instability index (MII) for the purposes of evaluating and comparing the

⁴Average annual growth rates, over a period of time, that are not repoted in Table 7.1 are computed by using the same procedure as in Table 7.1.

⁵See Celasun and Rodrik (1989) and Rodrik (1990) for a thorough overview of this period. ⁶These ratios (in constant prices) show similar patterns.

⁷See Appendix K for more technical detail on MII.

level of macroeconomic instability within a period and between the periods, respectively.⁸ MII is relatively more comprehensive measure of macroeconomic instability since it is also based on other macroeconomic instability indicators identified by previous researchers,⁹ which affect capital accumulation and economic growth in the long-term as well as in the medium-term (see Appendix K for more detail on MII.). Hence, a rise in macroeconomic instability index means a rise in one or more policy-induced macroeconomic instability indicators, such as inflation rate, change in exchange rate, public deficit to GNP ratio and external debt to GNP ratio.

Figures 7.6 and 7.7 provide the time plots of the two macroeconomic instability indicators, namely, inflation and MII. Generally speaking, macroeconomic environment was quite stable during the 1960s, as it is evident from these figures.¹⁰ During this decade average inflation rate (INF) was 5.2%, and it is the lowest compared to the 1970s (27%), the 1980s (50.4%) and the 1990s (73.2%). Similarly, the 1960s decade average of the MII, 0.04 points, is the lowest compared to the others (see Table 7.1). However, mainly due to foreign exchange difficulties of the late 1960s, in 1970 Turkey introduced an IMF-based stabilization package, which involved a maxi devaluation.¹¹

As it is evident from Figures 7.6 and 7.7, the macroeconomic environment has started to become unstable from the mid-70s onwards. During the 1973-77 period, Turkey delayed its internal adjustment to the external shocks of this period via reserve decumulation initially and excessive short-term borrowing later on (Celasun and Rodrik, 1989). In turn, the deterioration of the fiscal balances (mainly due to the significant rise in public investment) and the excessive reliance on foreign borrowing were among the main reasons behind the significant rise in the macroeconomic instability during the mid-70s.

⁸MII is also utilized in more formal empirical investigation in the next chapter.

⁹See Section 6.3 for more detail.

¹⁰This observation is in line with Celasun (1994).

¹¹See Celasun (1994) and Krueger (1974) for more detail.



Figure 7.4 Private Investment-GNP Ratio (current), 1963-1999



Figure 7.5 Public Investment-GNP Ratio (current), 1963-1999



Figure 7.6 Inflation, 1963-1999



Figure 7.7 Macroeconomic Instability Index (MII), 1963-1999

During the 1973-77 period political environment was polarized and this led to inadequate macroeconomic policy making. This, in turn, has contributed to the rise in macroeconomic instability; however, as pointed out by Celasun and Rodrik (1989: 635) "this should not cloud the fact that a series of weak governments of varying political ilk still managed to undertake an impressive and sustained investment boom."¹² Nevertheless, from the mid-1977 and onwards political environment has become more polarized and unstable due to more frequent changes of successive weak coalition governments. These coalition governments "have been associated with instability and lacked credibility and commitment to undertake serious fiscal adjustment" (Onis, 2002: 6).¹³ During the late 1970s Turkey reached a state where it could no longer service even its short-term debts and hence entered severe economic crisis.¹⁴

The late 1970s have been very costly in terms of the losses in growth and capital formation and since then macroeconomic instability became a chronic characteristic of the Turkish economy. As can be seen from the Figures 7.6 and 7.7, macroeconomic instability rose very sharply between the 1977-1980 and was peaked in 1980. Furthermore, despite the high and steady growth rate of the 1963-77 period, the economic growth turned out to be negative from the 1977 to 1980 (real GNP contracted at an average annual rate of 0.7%). Similarly, public and private investments also suffered during this period. While real public investment declined at an annual rate of 4.6%, real private investment decreased at an annual rate of 11%, on average, from the 1977 to 1980.

To sum up, 1978-9 crisis was very costly in terms of macroeconomic performance and brought an end to import substitution strategies and hence to the inward-oriented growth strategy.

 $^{^{12}}$ As succinctly stated by Celasun and Rodrik (1989: 629), "the 1970s were the best of times and the worst of times" for the Turkish economy.

¹³This is in line with the main implication(s) of the theories on "delayed stabilizations". See Drazen (2000) and Veiga (2000) for an overview. Also see Chapter 2 for an overview.

¹⁴See Celasun and Rodrik (1989) for a thorough discussion of this period.

7.3 The Outward-Oriented Period, 1980-99

As pointed out earlier, 1980 was a turning point for the Turkish economy since Turkey took a crucial decision to switch its overall economic strategy from inward-oriented growth strategy to outward-oriented growth strategy. Therefore, the analysis of the outward-oriented period would naturally begin with a brief summary of the 1980 Stabilization and Adjustment Program, which is the cornerstone of that overall shift in the economic strategy.

This program had both stabilization and structural aspects (e.g. trade and financial liberalization), and was strongly backed by the IMF, World Bank and OECD consortium. The role of state has crucially changed with this program. One of the key changes was the abandonment of the economy-wide formal planning.¹⁵ Furthermore, the state changed its investment strategy from manufacturing to infrastructure. Moreover, export-promoting policies were also among the crucial aspects of the program.¹⁶

In the early 1980s, Turkey successfully implemented the 1980 program, albeit under the military regime of the 1980-3.¹⁷ However, this period was special in the sense that the policy makers were insulated from political pressures and conflicts under the military rule, and hence realized downward flexibility in real agriculture support prices and wages (i.e. policy makers avoided distributional pressures), which have become central elements of the adjustment process (Celasun and Rodrik, 1989: 664). Turkey also benefited from debt relief, support from OECD countries, and favorable market conditions in the Middle East while implementing this program.^{18,19} Thus, Turkey managed to

¹⁵Even though the five-year development plans are still prepared, the state has lost the means for forcing them on private and public sector (Ekinci, 2000).

¹⁶See Aricanli and Rodrik (1990), Barlow and Senses (1995), Boratav and Turel (1993), Boratav *et al.* (1996), Celasun (1990,1994), Celasun and Rodrik (1989), Ekinci (1990,2000), Metin-Ozcan et al. (2001), Rodrik (1990) and Senses (1990,1991) for an assessment of the 1980 program and Turkey's post-1980 adjustment.

¹⁷Military (coup) took the control of the country in September 1980.

¹⁸See Celasun and Rodrik (1989) for more detail on these favourable conditions.

¹⁹See Celasun and Rodrik (1989), Ekinci (2000) and Senses (1991) among others for further

reduce the high level of macroeconomic instability inherited from the severe economic crisis of the late 1970s to a more moderate level during the early 1980s and restored growth. Inflation rate and macroeconomic instability index (MII) fell from 89.6% and 0.520 points in 1980 to 26% and 0.317 points in 1983, respectively.

Overall, macroeconomic management was also quite good during the mid-1980s.²⁰ However, starting from the late 1980s macroeconomic instability rose again and it remained as an endemic characteristic of the Turkish economy during the 1990s. Political instability and related populist and myopic policies,²¹ and associated problems of public sector imbalances were blamed most for the persistence of high macroeconomic instability and resultant unfavorable macroeconomic performance from the late 1980s onwards (see, for example, Ozatay, 1999 and Onis, 2002).²² Therefore, the role of political instability on fiscal policy dynamics, such as public spending and debt dynamics, deserve a more detailed analysis. For this purpose political power dispersion index, which is frequently used to measure political instability, can be utilized. This index was developed by Roubini and Sachs (1989b) with the aim of investigating the effects of political instability (and polarization)²³ on the debt accumulation. This index takes a value between 0 and 2 according to the electoral strength of the governments, i.e. weak vs. strong governments.²⁴ The higher the index value the higher the political instability.

Ozatay (1999) has formed a similar index, with some modifications based on the developments in the Turkish politics, to measure the relationships between political instability and several fiscal policy indicators, including do-

information on the implementation of the 1980 program.

 $^{^{20}}$ See Celasun and Rodrik (1989) for detailed analysis.

²¹See, for example, Ozatay (1999) and Akyurek (1999) for empirical evidence.

²²As will be explained later, other factors (e.g. structural) also significantly contributed to this undesirable performance.

²³As noted in Chapter 2, political instability and polarization are highly correlated and "they often tend to come together: coalition governments are generally short-lived" Persson and Tabellini (2000: 367).

²⁴See Roubini and Sachs (1989b) for more detail.

mestic debt-to-GDP ratio, for the 1984-1995 period in Turkey. Particularly, Ozatay considered the political developments during the period following the latest military rule (1980-3) in Turkey while forming the political instability index. A brief summary of these developments will be provided next for the sake of understanding the construction of this index and for later analyses.

Due to the political bans on some politicians and political parties only few newly formed political parties were able to take part in the general elections held in November 1983. ANAP (Motherland Party) won this election by obtaining the majority of the votes. Until 1987, the competition free political arena had provided ANAP the opportunity of being the strongest party in Turkey. In 1987, however, political bans were lifted and the banned politicians and political parties once again had entered the Turkish political arena. ANAP (the ruling party) still obtained the majority of the seats in the 1987 general elections, but compared to the previous elections its share in the total votes significantly decreased due to the increased opposition. Furthermore, ANAP was heavily defeated and became the third party (with almost 1/5 of the total votes) in the municipality elections in March 1989.²⁵ With the general elections held in 1991 the ruling of ANAP came to an end and coalitions became the dominant feature of the Turkish governments throughout the 1990s. This has continued till the 2002 elections.

In light of these political developments, Table 7.2 provides the political instability index for the 1984-1999 period. The political instability index clearly reflects this recent history, it was 0 for the 1984-1986 period, 1 for the 1987-1989 period and 2 from 1990 onwards.²⁶ This table also provides summary

²⁵This result is mainly ascribed to the disappointment of wage earners and agricultural sector due to worsening income shares during the 1980s adjustment and to the rising claims for more democratic advances (Ekinci, 2000: 4). ANAP replied by significantly rising public wages and agricultural prices. Consequently, and with the help of increased military expenditures, fiscal balances deteriorated (Ekinci, 2000).

 $^{^{26}}$ These values are from Ozatay's (1999) index data (1983-1995). The update is made to the post-1995 period.

information on the selected indicators regarding the public spending and debt dynamics for the 1980-1999 period.

The main result from Table 7.2 is that the higher political instability is significantly associated with deterioration in fiscal stance,²⁷ e.g. debt accumulation and rising budget deficits, and worsening macroeconomic instability. Another clear message from this table is that the simultaneous deterioration of political and fiscal stance had an adverse effects on public investments.

These results are in line with a number of key implications of the political macroeconomy models of Part II (see Chapters 4 and 5). For instance, it has shown that high level of political instability may lead to myopic policies (via electoral uncertainty) in the forms of low level of public investment and excessive debt accumulation.²⁸ Furthermore, it has also shown that political instability may possibly affect public spending decisions directly due to the characteristics of the socio-political structure (see Chapter 4). For example, governments in more unequal societies have more incentives to follow populist policies which contains redistributive public spending. Wage and agriculture price repressions worsened the income inequality during the adjustments of the 1980s (see, for example, Celasun, 1989 and Ekinci, 2000). With the end of the politics and competition-free political era (1980-6) in 1987, "accumulated distributional claims" was one of the major concerns of the political parties'. Hence, this was the main incentive behind the switch to the populism in the late 1980s and onwards (Onis, 2002).

 $^{^{27}}$ This argument is in line with Ozatay (1999).

 $^{^{28}}$ Moreover, the higher the number of parties in the coalition, the harder will be the cooperation or agreement on economic policy. See Section 2.3 for an overview and further references.

| | Political | Macro- | Domestic | Inte- | Public | Composition of Public Spending | | | |
|---------|-----------|-------------|----------|-------|------------------|--------------------------------|---------|--------|-------------|
| | Instabi- | economic | Debt | rest | Budget | Cur- | Invest- | Inte- | Other |
| Period | lity | Instability | Stock* | Exp.* | Deficit * | rent** | ment** | rest** | Transfers** |
| 1980-83 | | 0.359 | 3.2 | 0.4 | -1.5 | 43.5 | 19.1 | 5.4 | 32.1 |
| 1984-86 | 0 | 0.449 | 4.3 | 0.9 | -3.5 | 38.7 | 19.2 | 13.6 | 28.5 |
| 1987-93 | 1.5*** | 0.507 | 8.2 | 2.4 | -4.3 | 46.8 | 10.6 | 20.7 | 22.0 |
| 1987-89 | 1 | 0.525 | 5.9 | 1.9 | -3.4 | 40.8 | 12.9 | 21.1 | 25.2 |
| 1990-93 | 2 | 0.493 | 9.9 | 2.9 | -5.0 | 51.3 | 8.8 | 20.4 | 19.6 |
| 1994-99 | 2 | 0.657 | 19.7 | 8.4 | -7.0 | 35.3 | 6.1 | 35.2 | 23.4 |

Table 7.2 Political Instability, Public Spending and Debt Dynamics, 1980-1999

* Percent of GNP.

** %-age share in total expenditures.

*** Average of the two sub-periods: 1987-89 and 1990-93.

Note: Public budget is the consolidated budget; Domestic debt represents government bonds + T-bills; Macroeconomic Instability is represented by MII; Political instability is proxied by the modified political power dispersion index (Ozatay, 1999).

Source: Authour's calculation from SPO data (http://www.dpt.gov.tr).



Figure 7.8 Public Infrastructural Investment (% of total public investment), 1963-1999

Nevertheless, as will be explained below, public spending and debt dynamics of the Turkish economy over the late 1980s and the 1990s are realized under a special set of circumstances, such as financial liberalization. Therefore, given the simple contexts of the models of Part I, the main results of Chapters 4 and 5 could only explain the portion of the reality on the certain aspects of the public spending and debt dynamics of the Turkish economy during that period.

Thus, two crucial changes in the policy regimes need to be mentioned before analyzing the policy dynamics of the late 1980s and onwards. During 1988 and 1989, Turkey established the domestic capital markets and the Treasury switched the mode of deficit financing from monetization to domestic borrowing with new financial instruments. Moreover, in 1989, Turkish Lira became fully convertible and capital account was fully-liberalized.

From the late 1980s to the end of 1993, the elected governments in Turkey had managed to maintain the populist and myopic policies, through the reliance on domestic borrowing, mainly with the help of capital inflows.²⁹ However, the cost of this strategy was very high, real interest rate on domestic debt had increased steadily during the early 1990s and this further deteriorated the fiscal balances; for instance, domestic interest payments (as % of GNP) rose from 1.9% in the 1987-89 to 2.9% in the 1990-93.³⁰ Similarly, budget deficit (as % of GNP) also deteriorated during this period, from -3.4% in the 1987-89 to -5% in the 1990-93 (see Table 7.2).

Turkey experienced a very severe financial crisis in the early 1994 mainly due to unsustainable fiscal balances, the collapse of the domestic debt market, monetization and the expectations of further monetization.³¹ Real GNP contracted by 6.1% during 1994, which is the peak rate of contraction in the

²⁹See, for instance, Yenturk (1999) and the references therein for the discussion of the role and impact of short-term capital flows on macroeconomic policies in Turkey.

³⁰The performance of the Turkish economy also became very sensitive to capital flows. See Celasun (2002) for more detail.

³¹See, for example, Celasun (1998), Celasun (2002), Ekinci (2000), Ozatay (1997, 2000), Yeldan (1997) and the references therein for an overview and sources of the 1994 crisis.

Turkish economy over the 1963-1999 period. Similarly, real public investment fell dramatically, about 40%, from 1993 to 1994.³² Real private investment, however, contracted only moderately (about 5%). Both inflation and MII peaked in 1994, inflation rate was 107.3% and MII was 0.842 points in 1994. Furthermore, Turkish Lira depreciated by more than 150% against US\$ in 1994. In mid-1994, Turkey adopted an IMF-based stand-by agreement, and managed to cool-down this severe economic crisis. Inflation rate and MII fell from 107.3% and 0.842 points in 1994 to 87.2% and 0.563 points in 1995, respectively.

However, macroeconomic instability has continued until the late 1990s, mainly due to the reluctance of governments (e.g. to avoid negative political consequences) to take the necessary painful measures (e.g. fiscal and banking sector reforms); in other words, governments delayed the reforms and stabilization.³³ During this period, especially towards the end of the 1990s, public sector balances became unsustainable due to the reliance on domestic borrowing mainly for the financing of interest payments arising from domestic borrowing. Domestic interest payments (as % of GNP) sharply rose from 2.9% in the 1990-93 to 8.4% in the 1994-99. Similarly, domestic debt (as % of GNP) doubled during this period, from 9.9% in the 1990-93 to 19.7% in the 1994-99(see Table 7.2). In line with these developments, budget deficit (as % of GNP) deteriorated from -5% in the 1990-93 to -7% in the 1994-99. Thus, the main cause of the rise in domestic debt changed during the post-1994 crisis period.³⁴ That is, while the financing of the populist spending is the principal motive for the reliance on domestic borrowing during the pre-1994 crisis period, the financing of domestic interest payments is the main motive during the post-1994 crisis period of the 1990s.

³²This is a solid evidence of the negative effect of macroeconomic instability on fiscal "ability" of governments for making investment.

 $^{^{33}}$ See, for example, Veiga (2000) for well-documented reasons and empirical evidence on "delayed stabilizations" literature. Also see Chapter 2 for more detail.

 $^{^{34}}$ See, for example, Celasun (2002) and Ekinci (2000) for a discussion on the macroeconomic and financial developments in the Turkish economy, during the 1990s.

During the 1990s the striking feature of the market for domestic borrowing was that the commercial banking sector was the primary buyer in the shallow market.³⁵ Thus, government's rising demand for borrowing relative to the size and the structure of the market has been the main factor fuelling the real interest rates.³⁶ As a result, real interest rate on net debt of public sector almost doubled from 1990 to 1999.³⁷ Keyder (2003: 11) points out that "[t]he real interest rate, in large part, reflects the risk premium, which is closely tied to people's confidence in the economy and in the government". Hence, real interest rates rose in conjunction with macroeconomic instability.

Additionally, Celasun (2002: 53) points out that "especially after 1997, the gap between real interest rates and GDP growth rates increased, worsening the public sector debt dynamics and leading to a debt accumulation problem which is very painful to resolve". Therefore, in the late 1990s, "[t]here is no question about the fact that public balances of Turkey were on an unsustainable path and that immediate action was required to redress them" (Ekinci, 2000: 14). Hence the coalition government signed a three-year IMF-based stand-by agreement in December 1999, which mainly aimed to solve the public sector imbalances.³⁸ Unfortunately, this program had failed in the February 2001 due to a major economic crisis (real GNP contracted by 9.4% during 2001)³⁹ and Turkey signed another program backed by the IMF and the World Bank, which is still being implemented today.

In retrospect, chronic and rising macroeconomic instability since the late

 $^{^{35}}$ During the 1990s, the average share of the treasury bills and bonds bought by the Turkish banking sector was about 84%.

³⁶Banks profited from low maturity and high yield securities offered by government to roll over public debt, during the 1994-99. See Kipici and Ozkan (1998) for a game-theoretic macroeconomy model that analyzes the effects of banking sector, which plays a major role in shaping the debt structure as primary buyer of the government bonds, on cost of domestic borrowing.

 $^{^{37}}$ From 14.2% in 1990 to 25.2% in 1999, see IMF (2000).

 $^{^{38}}$ See Ekinci (2000) and the references therein for a thorough overview of fiscal and other public sector related problems and extensive assessment of the aspects of this program.

³⁹See Onis (2002), Celasun (2002) and Ozkan (2003) for a detailed analysis on the November 2000 and the February 2001 crises.

1980s seemed to be the main reason behind the low and volatile growth and investment performances during the outward-oriented period, especially in the 1990s. During the outward-oriented period, real GNP grew at an annual rate of 4.6%, on average. Furthermore, real GNP fluctuated more during this period compared to the inward-oriented period. Nevertheless, growth rate was higher during the 1980s (5.3% per year) compared to the 1990s (4% per year) and volatility of real GNP was lower during the 1980s (see Figure 7.1). This is due to the significant reduction in macroeconomic instability in the early 1980s and relatively more stable macroeconomic environment of the 1980s, compared to the 1990s.

Both private and public capital formation rates are lower in the outwardoriented period compared to their rates in the inward-oriented period. Nevertheless, private sector's capital formation performance was better compared to public sector's performance during the outward-oriented period. Real private (public) investment grew at an average annual rate of 9% (0.7%), from 1980 to 1999 (Table 7.1). As with real GNP, volatility of both public and private investment have increased during the 1990s (see Figures 7.2 and 7.3).

As discussed previously, the crucial change in this period was the changing role of the state in the investment process. During the outward-oriented period, especially in the 1980s, Turkey switched its public investment strategy towards infrastructure. The share of public core infrastructural (transport + communication + energy) investment in total public investment rose from 37.3% in the inward-oriented period to 50.5% in the outward-oriented period. As Figure 7.8 reveals, this ratio has increased steadily from 1980 (42.1%) to 1989 (59.9%), which was the peak value of the whole period (1963-99).

In contrast, the share of public non-(core) infrastructural investment in total public investment, which is a mirror image of the share of infrastructural investment in total public investment, dropped from 57.9% in the 1963-79 to 40.1% in the 1980-99. The burden of adjustment fell on to the (public) manufacturing sector during this period, as the public sector aimed to withdraw from manufacturing in line with the 1980 program.

As Figure 7.8 reveals, the share of infrastructure investment in total public investment fell steadily from 1990 (55.7%) to 1995 (43.7%) and then rose steadily from 1995 to 1999 (51.1%). Moreover, while private investment-GNP ratio (in current prices) rose from 12.8% in the 1980s to 18.1% in the 1990s, public investment-GNP ratio dropped from 8.8% in the 1980s to 6.2% in the 1990s.^{40,41} In line with this trend, public infrastructural investment-GNP ratio also fell from 4.5% in the 1980s to 3.1% in the 1990s. Likewise, average annual growth rate of public infrastructural investment turned out to be negative (-0.3% per year) during the 1990s. The main reason behind these falls is the rising macroeconomic instability after the late 1980s, which has seriously lowered the fiscal and political "ability" of governments for making necessary investments, especially infrastructure investments, due to budgetary pressures.⁴² Figure 7.9, which shows the relationship between macroeconomic instability and the share of public investment in the consolidated budget, provides supporting evidence for this argument.

Since the late 1980s, rising domestic indebtedness led to a high debt burden (e.g. interest payment) and lowered the overall public resources available for other public expenditures.⁴³ This is clearly seen from Figure 7.10 (and Table 7.2), the share of interest payments (of most of which is due to domestic debt) in the consolidated public budget has risen since the late 1980s.

⁴⁰These ratios (in constant prices) show similar patterns.

⁴¹It should be noted here that few figures regarding investment-GNP ratios and the associated average annual growth rates of the related investment variable (numerator) and GNP (denominator) that are reported in Table 7.1 are not consistent (when we compare decade averages) possibly due to "averaging" and the existence of outliers. For example, while the average (real) public investment-GNP ratio rose from the 1970s to the 1980s, real public investment (real GNP) average annual growth rate fell (rose) from the 1970s to the 1980s.

 $^{^{42}}$ In line with this argument, Conway (1990: 82) stated that "[r]eal public investment growth appears to have [negatively] responded to budgetary pressures" in Turkey.

 $^{^{43}}$ Similarly, as mentioned in Section 6.3, a rise in inflation rate (or in macroeconomic instability) may result in a loss of seigniorage via dollarization. See Bahmani-Oskooee and Domac (2002) for evidence on the role of instability on dollarization in Turkey.



Figure 7.9 Macroeconomic Instability Vs. Share of Public Investment in Total Public Expenditures of Consolidated Budget, 1975-1999



Figure 7.10 Composition of Public Spending out of Consolidated Budget, 1975-1999

In contrast, the share of public investment has fallen steadily during this period. As mentioned in Chapter 6, the incumbent governments tend to lower public capital expenditures rather than current or transfer expenditures when they face fiscal stringency (e.g. due to higher interest payments) since it is politically less costly option to cut public investment rather than current and social transfer spending, especially in unstable political environment. Recall that a rise in the level of political instability and polarization from the late 1980s onwards also contributed to the initial decline in public investment via populism (1987-1993). In sum, excessive reliance on domestic borrowing has been a very costly strategy in the sense that it has not only sky rocketed real interest rates but also plummeted public investments.

7.4 Conclusion

Generally speaking, since the mid-1970s macroeconomic instability has steadily increased and has become a chronic problem in the Turkish economy. While the macroeconomic instability episode of the late 1970s and more recent episode of the late 1980s and 1990s have taken place under different economic structures and policy making framework, fiscal imbalances as well as political instability and polarization have remained as the endemic characteristics of the Turkish economy.

The main result from the descriptive analysis of this chapter is that chronic macroeconomic instability and recurrent crises have been costly for the Turkish economy and politics, in terms of the losses in capital accumulation and growth as well as in terms of the deterioration in the confidence of the public for the Turkish politics. Moreover, the burden of the recent macroeconomic instability episode, which is characterized by a rise in populist spending and excessive interest payments (due to excessive reliance on domestic borrowing), seemed to fall disproportionately on public investments. Next chapter will formally analyze the effects of macroeconomic instability on public and private capital formation (as well as on the nature of the relation between the two) and growth, for the 1963-99 period.
CHAPTER 8

AN EMPIRICAL ANALYSIS OF THE ROLE OF MACROECONOMIC INSTABILITY IN PUBLIC AND PRIVATE CAPITAL ACCUMULATION AND GROWTH: THE TURKISH EXPERIENCE, 1963-1999

8.1 Introduction

This chapter investigates the effects of macroeconomic instability on public and private investment as well as on the nature of their relationships and economic growth in the Turkish economy (1963-1999).

Many economists nowadays believe that macroeconomic instability is detrimental to capital accumulation and economic growth, and there is empirical evidence that supports this view.^{1,2} However, theoretical arguments in this line of research focused on the detrimental effects of macroeconomic instability on private investment and productivity. Moreover, previous empirical studies (see

 $^{^{-1}}$ See Section 6.3 for an overview of theoretical arguments and empirical evidence.

 $^{^2 {\}rm The}$ descriptive evidence from the Turkish experience is consistent with this view (see Chapter 7).

section 6.3) assessed the effects of macroeconomic instability on private or total investment but not public investment in their analyses. Nevertheless, as discussed in more detail in Section 6.3, macroeconomic instability has negative effects on both private and public investment, albeit through different channels. Additionally, given the detrimental effects of macroeconomic instability on public investment, chronic macroeconomic instability can be very costly in terms of private capital accumulation and hence economic growth if public and private investment are complementary; that is, if public investment crowdsin private investment. Thus, there seems to be an additional (indirect) link between macroeconomic instability and economic growth due to the possible complementarity between public and private investment.

Currently there are two related strands of research on the role of public capital spending in capital accumulation and economic growth.³ While the first one focuses on the public capital spending and private investment nexus, the second approach analyzes the public capital spending and output nexus. In this research area, many studies found significant complementarity (crowding-in) effect, but some studies were either inconclusive or found contradictory results (see Section 6.2). The evidence for the Turkish economy is also ambiguous (see Section 6.4).

As indicated before, early studies on these two groups of literature were criticized on the empirical grounds. The main empirical criticisms were related to the spuriousness of the empirical results and ignoring the reverse-causation and simultaneity (see Section 6.2). To overcome these empirical problems, recent studies used modern time series techniques, such as multivariate cointegration and impulse response functions, in their analyses of the effects of public investment on private investment and output. (Ghali, 1998; Pereira, 2000; and Mittnik and Neumann, 2001).⁴ However, the effects of macroeconomic instability on public investment and private investment as well as on the nature of

³For more detail see Chapter 6.

⁴Private investment, public investment and output were the commonly used variables

their relationships and output have not been investigated in the recent literature. Therefore, this chapter extends the recent literature on the role of public capital spending in capital accumulation and economic growth to include the issue of macroeconomic instability and by considering the Turkish experience during the 1963-1999 period. To accomplish this, the long-run relationship between public investment, private investment, macroeconomic instability⁵ and output are estimated by using multivariate cointegration analysis. The empirical analysis is also extended by considering the infrastructural component of public investment. Furthermore, the generalized impulse response functions are used to examine the dynamic effects of a rise in (i.e. a shock on) a given variable, e.g. in public investment and macroeconomic instability, respectively, on all the other variables in the system.

This chapter is organized as follows. Section 8.2 provides a condensed overview of the empirical methodology. Empirical results appear in Section 8.3 and finally Section 8.4 concludes the chapter with a summary and the policy implications of the findings.

8.2 Methodology

This section briefly discusses the Johansen multivariate cointegration technique and generalized impulse response functions that will be employed in later empirical analyses.

Johansen technique (Johansen, 1988 and Johansen, 1995) is the well-known and widely used technique in multivariate cointegration analysis. This tech-

in their analyses of the effects of public capital spending on private capital spending and output. Furthermore, all of these variables were usually in logs (Ghali, 1998; and Mittnik and Neumann, 2001). For more detail, see Section 6.2.

⁵In line with the descriptive analysis of the previous chapter, macroeconomic instability is proxied by the MII.

nique can be briefly summarized as follows. The following vector autoregressive [VAR(p)] model is considered,

$$\mathbf{y}_{t} = \boldsymbol{\mu}_{0} + \boldsymbol{\mu}_{t}t + \sum_{i=1}^{\mathcal{H}} \boldsymbol{\theta}_{i}\mathbf{y}_{t-i} + \boldsymbol{\Psi}\mathbf{w}_{t} + \mathbf{u}_{t}, \quad t = 1, 2, 3...n$$
(8.1)

where \mathbf{y}_t is $m \ x \ 1$ vector containing the m jointly determined (endogenous) variables in the system, i.e., $\mathbf{y}_t = [\mathbf{y}_1, \mathbf{y}_2, \dots, \mathbf{y}_m]$, \mathbf{w}_t is $q \ x \ 1$ vector containing the deterministic variables, p represents the lag-length, or order of the VAR, $\boldsymbol{\theta}_i$ represents the coefficient matrix $(i = 1, 2, \dots, p)$, t is the time trend and \mathbf{u}_t is a multivariate disturbance term (a vector of white noise process).⁶

Provided that all the variables are integrated of order one, denoted as I(1), this model can be reparametrized into vector error correction model (VECM),⁷ which forms the statistical framework of the cointegration analysis,

$$\Delta \mathbf{y}_t = -\mathbf{\Pi} \mathbf{y}_{t-1} + \bigotimes_{i=1}^{\mathbf{K}^1} \mathbf{\Gamma}_i \Delta \mathbf{y}_{t-i} + \Psi \mathbf{w}_t + \boldsymbol{\mu}_0 + \boldsymbol{\mu}_t t + \mathbf{u}_t, \quad t = 1, 2, 3...n \quad (8.2)$$

where Γ_i 's are estimable coefficients matrices, $\Pi = \alpha \beta'$ matrix represents the long-run relationships (α is a matrix of adjustment coefficients and β is the long-run coefficients matrix, i.e. cointegrating vectors) and all the other variables are as defined before.

Matrix of primary importance is the Π matrix since its rank, denoted by r, tells us the number of cointegrating relations. Therefore, determination of the rank of Π , which is usually referred to as the cointegrating rank, also determines the number of cointegration or long-run relationships (also referred to as cointegrating vectors). Fortunately, Johansen technique is capable of

 $^{^6\}mathrm{See}$ Johansen (1995), Pesaran and Pesaran (1997), Johnston and Dinardo (1997) and Harris (1995) among others for more detail.

 $^{^7\}mathrm{See}$ Johnston and Dinardo (1997) and Pesaran and Pesaran (1997) among others for more detail.

both determining the number of cointegration relations and estimates of α and β matrices in multivariate framework. Furthermore, another strength of the Johansen technique is that it allows for testing restrictions on the coefficients of the long-run relationships, i.e., on the coefficients of α and β including overidentifying restrictions. This is crucially important when there is more than one long-run relationship, since the issue of identification arise.

In empirical cointegration analysis, the following steps are used:

- Step 1. Selecting the relevant variables, i.e. forming the system (y_t vector), for the cointegration analysis from the relevant economic framework or theory.
- Step 2. Testing for unit root(s) to ensure that all the variables in y_t vector are integrated of order one. This can be checked by the ADF test (see, for example, Pesaran and Pesaran, 1997 and Franses, 1998).
- Step 3. Determining the order (p) of the underlying VAR model. Using model selection criteria, such as Akaike Information Criterion and Schwarz Bayesian Criterion, or LR-tests or both can do this (Pesaran and Pesaran, 1997: 421).
- Step 4. Deciding on the deterministic components, such as intercepts, trends and dummies, of the underlying VAR. There are alternative routes for achieving this. First one is a priori determination based on economic theory and time series properties of the variables in the model. Second one, which is purely statistical, is the joint determination of cointegration rank (r) (Step 5) and deterministic components of the underlying VAR (Step 4) (see, for instance, Harris, 1995; Pesaran and Pesaran, 1997; Pesaran and Smith, 1998; Doornik et al. 1998; and Johansen, 1995).
- Step 5. Determining the cointegration rank (r) and estimation. The trace and max (maximum eigenvalue) tests proposed by Johansen (1988)

can determine the cointegration rank. An alternative to this is proposed by Pesaran and his colleagues, which is a priori or theory-consistent fixing of r (see, for instance, Pesaran and Smith, 1998). However, the former is the widely used approach. See, for example, Johansen (1991,1995) and Pesaran and Pesaran (1997) among many others for estimation procedures of cointegration relationships with the Johansen technique.

• Step 6. Identifying the cointegration relationships. If the number of cointegration vectors is equal to one (r = 1), identification is purely based on the economic framework or theory. However, if the number of cointegration vectors exceeds one (r > 1), then over-identifying restrictions should be tested by appropriate LR test (see, Johansen, 1995; Harris, 1995; and Pesaran and Pesaran, 1997). After testing, restricted cointegration relationships should be estimated. See Johansen (1995) and Pesaran and Pesaran (1997) for estimation procedures of restricted cointegration relationships with the Johansen technique.

In addition to the estimation and testing of the long-run relationships, impulse response analysis can also be utilized to get more insights and to examine the dynamic effects, i.e. short and medium-run effects, of a shock on a given variable on all the other variables in the cointegrated system. See, for instance, Lutkepohl and Reimers (1992) and Pesaran and Pesaran (1997) among many others for more detail on the discussions of the importance and the technical details of impulse response (IR) analysis in cointegrated systems. *Orthogonalized* IR functions are widely used technique in empirical studies. However, orthogonalized IRs are not unique and they usually depend on the ordering of the variables within the system. Recently many researchers preferred the *generalized* impulse response functions for examining the aforementioned dynamic effects since, unlike the orthogonalized IR functions, they do not depend on the ordering of the variables within the system (see Pesaran and Shin, 1998).⁸

⁸Pesaran and Pesaran (1997) compares the two different types of impulse response func-

Therefore, this study also prefers the generalized impulse responses for the same reason.

8.3 Empirical Results

8.3.1 The Data and Unit Root Tests

The data used in this study are Turkish annual data from 1963 to 1999. The sample period is determined by the availability of official investment data. The definitions of the variables used in the empirical studies are provided below (see Appendix K for more detail on the definitions and the sources of the data):

- y: Natural logarithm of real GNP.
- *ip*: Natural logarithm of real private fixed investments.
- *ig*: Natural logarithm of real public fixed investments.
- *igi*: Natural logarithm of real public fixed infrastructural investments.
- *mii*: Natural logarithm of the macroeconomic instability index (MII).⁹

Figures 8.1-8.3 show the time plots of the above variables. Visual inspection of the data suggests that all these series have a unit root(s). However, we also provide the formal unit root test¹⁰ results in Table 8.1. As expected, for all the variables the null hypothesis of a unit root are not rejected at 95% critical level. Furthermore, the null hypothesis of a unit root for the first differences of all variables are rejected at 95% critical level. Therefore, all the variables under consideration are integrated of order one [I(1)].

tions in more detail and also provides empirical example.

⁹Note that mii = ln(1+MII), where ln denotes natural logarithm. Otherwise we obtain negative results by using mii = ln(MII), since MII is bounded between 0 and 1.

 $^{^{10}}$ See, for example, Hendry and Juselius (2000), Pesaran and Pesaran (1997) and Franses (1998) for more detail on the unit root tests.



Figure 8.1 Time plot of the logarithm of real GNP (y), 1963-1999



Figure 8.2 Time plots of the logarithms of real fixed private investment (*ip*), real fixed public investment (*ig*) and real fixed public core infrastructural investment (*igi*), 1963-1999



Figure 8.3 Time plot of the logarithm of macroeconomic instability index (*mii*), 1963-1999

| | | Perron Test | | | |
|-----------|----------------------------|-------------------------|----------------------------|--------------------|--|
| Variables | Variables Lev | | First Difference | Innovation Outlier | |
| | Without Trend ^a | With Trend ^b | Without Trend ^a | Model ^f | |
| у | -1.0696 (0) ^c | -2.4769 (0) | -4.9665 (0)* ^d | $-2.6439(0)^{h}$ | |
| ip | -1.2921 (1) | -3.0168 (3) | -3.3808 (0)* | -2.0148(1) | |
| ig | -2.2886 (3) | -2.4310(1) | -4.5756 (0)* | $-4.4852(2)^{g}$ | |
| igi | -1.9448 (0) | -1.8378 (0) | -4.4798 (1)* | -3.8352(1) | |
| mii | -1.2578 (1) | ^e | -8.0355 (0)* | ^e | |

Table 8.1 Unit Root Tests

^aADF regressions include an intercept but not a linear trend (see Pesaran and Pesaran, 1997: 53).

^bADF regressions include both an intercept and a linear trend (see Pesaran and Pesaran, 1997: 53)

⁶Numbers in parentheses are the order of augmentations (p^*) chosen by the Akaike Information Criterion (AIC). Note that unit root test results also hold when $p^*(s)$ are chosen by Schwarz Bayesian Criterion (SBC). Due to a size-power trade-off in the determination of the order of augmentation (p) of ADF tests, we choose to select p^* by AIC, which is a common practice in the applied works (see Pesaran and Pesaran, 1997: 213). Therefore, in line with Pesaran and Pesaran (1997: 213), first we estimated ADF regressions for p=0 to p=4 and selected the order of augmentation (p^*) based on AIC. Then, we performed the ADF tests (see the text). Note that the same sample period (1969-1999) is used in calculations.

^dAn asterisk (*) represents the rejection of the unit root null hypothesis at 95% critical level (MacKinnon, 1991, Table 1) ^e Since MII is bounded between 0 and 1 due to its construction (see the data appendix), we did not include trend for *mii* (see, for example, Ahmet and Rogers, 2000). Furthermore, linear trend in *mii* is not meaningful from the economic point of view.

^fThis model is within the innovation outlier framework and allows for both a change in the level and trend (see Franses, 1998: 150-1, for this test).

^gig rejects the null hypothesis at 95% critical level but not at 99% level (see Franses, 1998, Table 6.6, for critical values).

^hNumbers in parentheses are the order of augmentations (p^*) chosen by the Akaike Information Criterion (AIC). Note that test results also hold when $p^*(s)$ are chosen by Schwarz Bayesian Criterion (SBC) or if we just use the same $p^*(s)$ of the third column. We use the same procedure as in note (c) for determining the order of augmentation (p^*) . Note that the same sample period (1969-1999) is used in calculations.

However, it is well-documented that if we neglect the level and/or the trend shift (e.g. due to a structural break) in the unit root tests we could possibly obtain "spurious" unit root results (Franses, 1998). Therefore, since we know the break date quite well from the evidence reported in the previous chapter, which is 1980, a Perron test, which allows for a change in the level and the trend, are also performed (Perron 1989; and Franses, 1998). As can be seen from Table 8.1 all variables except ig cannot reject the null hypothesis of a unit root at 95% critical level. However, ig cannot reject the null at 99% critical level. Thus, it is now safe to conclude that all the variables are integrated of order one, which is a pre-condition for the cointegration analysis.

8.3.2 Cointegration Analyses

This section provides the cointegration analysis for investigating the long-run relationship(s) between public investment, private investment, macroeconomic instability and output in Turkey over the 1963-1999 period. As indicated previously the analysis will be performed for both total public investment and its infrastructural components. Therefore, two separate cointegration systems are formed: System #1 [ip, y, ig, mii] and System #2 [ip, y, igi, mii].

As stated before, Johansen multivariate technique will be used in the following cointegration analyses (Johansen, 1988, 1995). Following Doornik *et al.* (1998), Hendry and Juselius (2001) and Pesaran and Smith (1998) among others, a cointegration analysis is performed first with constant term entering unrestrictively but with a trend term restricted to lie in the cointegration space. However, the trend term was found to be insignificant in the cointegration relation(s);¹¹ hence, following Hendry and Juselius (2001) a cointegration analysis is performed with the constant term entering unrestrictively and without the trend term. Following Juselius (2001) and Juselius and Mac Donald (2000),

¹¹Underlying trends of the variables under consideration possibly cancelled out in the cointegration relation (Hendry and Juselius, 2001).

a step (intervention) dummy is also included in each cointegration system to account for the structural break of 1980. It entered restrictively to the cointegration space. However, this step dummy is found to be insignificant in the cointegration relation.¹² This might be due to the reason that 1980 structural break could have affected several variables similarly¹³ and hence causing the intervention effects to cancel out (Hendry and Juselius, 2001). Therefore, this dummy variable is not included in the following cointegration analyses.

Analysis Using Total Public Investment [System #1]

This sub-section provides the cointegration analysis for the System #1 [*ip*, y, ig, mii]. Table 8.2 provides the cointegration result for this system with the lag length of the VAR = $1.^{14}$ An impulse dummy for 1994 (D94) is also included unrestrictively in our cointegration analysis.¹⁵ The trace and max statistics suggest one cointegration relation,¹⁶ which seems to be the following simple long-run private investment relation:¹⁷

¹²Similarly, a step dummy is also included in each cointegration system to account for the effect of the full-financial liberalization in 1989. This step dummy is also found to be insignificant in the cointegration relation.

 $^{^{13}}$ As can be seen from Figures 8.1-8.3, there is some visual evidence on this.

¹⁴Note that the lag length of the VAR for each system is determined by Schwarz Bayesian Criterion.

¹⁵When the regression results for each equation in VAR(1) model are examined, ig equation has non-normal residuals. This is clearly evident in the residual plot of that equation in which 1994 is an outlying observation. (Note that this is consistent with the evidence in the previous chapter). Therefore, following Hendry and Juselius (2001), impulse dummy for 1994 (D94) is included in the cointegration analysis for System #1. After including D94 in VAR(1) unrestrictively, all equations have normal distributions and none of them show autocorrelation and heteroscedasticity (See Pesaran and Pesaran 1997 for the detailed information on these tests). Due to the same considerations impulse dummy for 1994 is also included in the cointegration analysis for System #2.

 $^{^{16}}$ It should be noted here that the trace and max statistics for System #1 without the impulse dummy (D94) also suggests one cointegration relation. Therefore, the above results are not an artefact of D94.

¹⁷Note that this is a simple investment relation since other determinants of investment, such as real interest rate, are absent in Equation (8.3) due to the purpose of the study, or data availability and/or limitations of cointegrated VAR analysis with relatively small sample size (Pesaran and Pesaran, 1997).

$$ip = 3.24y - 4.67mii - 0.29ig \tag{8.3}$$

This equation suggests that private investment is positively affected by output and negatively affected by macroeconomic instability in the long-run for the period under study. These results are consistent with the theory and the descriptive analysis of the Turkish economy, provided in the previous chapters. Moreover, private investment is negatively affected by public investment in the long-run, as can be seen from Equation (8.3). However, the standard errors of the cointegration vector in Table 8.2 show that all variables except ig are statistically significant. The significance of the variables is also formally tested by the exclusion test, which confirm the previous results (Table 8.2). Nevertheless, the cointegration result for System #1 without D94, suggests the following simple long-run private investment relation:

$$ip = 3.44y - 5mii - 0.38ig \tag{8.4}$$

Equations (8.3) and (8.4) are quite similar to each other but when standard errors (not reported) are examined all variables seem to be significant in Equation (8.4). The result of significance (exclusion) test provides a p-value of 0.059 for ig (y and mii both have p-value=0); therefore, there is some (but marginal) evidence of long-run crowding-out effect.

Analysis Using Infrastructural Public Investment [System #2]

This sub-section provides the cointegration analysis for an alternative version by substituting public core infrastructure investment (igi) for total public investment (ig).

| Tests of Cointegration Pank | | | | | | | | |
|---|-----------------------------|----------------------|----------|---------------|---------|---------|--|--|
| Eigenve | alues | <u>0.0</u> | 0.60355 | | 0.12638 | 0.03471 | | |
| Null Hy | vpotheses | 0.0 | r = 0 | | r < 2 | r < 3 | | |
| Max St | atistic | | 33 31 | | 4.86 | 1.27 | | |
| 95% C1 | itical Value ^a | e ^a 27.07 | | 20.97 | 14.07 | 3.76 | | |
| Trace S | Trace Statistic 48.31 | | 48.31 | 15.0 | 6.13 | 1.27 | | |
| 95% Critical Value ^a | | | 47.21 | 29.68 | 15.41 | 3.76 | | |
| | | | | | | | | |
| Cointeg | Cointegration Results (r=1) | | | | | | | |
| | ip | y | mii | ig | | | | |
| (β') ^b | 1 | -3.2364 | 4.6669 | 0.289 | | | | |
| - | | $(0.48324)^{c}$ | (1.2104) | (0.18182) | | | | |
| (α') ^d | -0.0919 | 0.0161 | -0.1449 | -0.0280 | | | | |
| Hypotheses Tests ^e $X^{2}(u)$ u n- | | | | | | p-value | | |
| Test of significance of v | | | 17.3 | <u>-</u> 1 | 0.00 | | | |
| Test of significance of <i>mii</i> | | | 24.3 | 1 | 0.00 | | | |
| Test of significance of <i>ig</i> | | | 2.2 | 1 | 0.14 | | | |
| Critical values are from Octanvald Lanum (1002 Table 1) | | | | | | | | |

Table 8.2 Cointegration Analysis of System #1

^aCritical values are from Osterwald-Lenum (1992, Table 1)

^bStandardized eigenvector.

^cAsymptotic standard errors are in parentheses. ^dAdjustment coefficients.

^eTest of long-run exclusion (see Hendry and Juselius, 2001).

Table 8.3 Cointegration Analysis of System #2

| Tests of Cointegration Rank | | | | | | | | |
|--|-----------------|------------------|------------------------------|------------|----------|--|--|--|
| Eigenvalues | | 0.638 | 0.17509 | 0.10778 | 0.042736 | | | |
| Null Hypotheses | | $\mathbf{r} = 0$ | r ≤ 1 | $r \leq 2$ | r ≤ 3 | | | |
| Max Statistic | | 36.58 | 6.93 | 4.11 | 1.57 | | | |
| 95% Critical Value ^a | | 27.07 | 20.97 | 14.07 | 3.76 | | | |
| Trace Statistic | | 49.19 | 12.61 | 5.68 | 1.57 | | | |
| 95% Critical Value ^a | | 47.21 | 29.68 | 15.41 | 3.76 | | | |
| Cointegration Results (r=1) | | | | | | | | |
| ip | y | mii | igi | | | | | |
| $(\boldsymbol{\beta}')^{\mathrm{b}}$ 1 | -3.1551 | 4.3892 | 0.20909 | | | | | |
| | $(0.39148)^{c}$ | (1.0593) | (0.12639) | | | | | |
| (α') ^d -0.0905 | 0.0185 | -0.1499 | -0.1393 | | | | | |
| Hypotheses Tests ^e | | | $\mathbf{X}^{2}(\mathbf{u})$ | <u>u</u> | p-value | | | |
| Test of significant | ce of y | | 17.7 | 1 | 0.00 | | | |
| Test of significant | ce of mii | | 29.5 | 1 | 0.00 | | | |
| Test of significance of igi | | | 2 | 1 | 0.16 | | | |
| Restricted Cointegration Analysis | | | | | | | | |
| ip | у | mii | | | | | | |
| (β') ^b 1 | -3.1539 | 5.2016 | | | | | | |
| | $(0.50615)^{c}$ | (1.4605) | | | | | | |
| $(\alpha')^{d}$ -0.0548 | 0.0198 | -0.1290 | | | | | | |

^aCritical values are from Osterwald-Lenum (1992, Table 1) ^bStandardized eigenvector.

^cAsymptotic standard errors are in parentheses. ^dAdjustment coefficients.

^eTest of long-run exclusion (See Hendry and Juselius, 2001).

Table 8.3 provides the cointegration results for this system with lag length of VAR = $1.^{18}$ The evidence favors one cointegration relation and it is also interpreted as private investment relation. The crucially different result in this system is that even though *igi* has negative (crowding-out) effect on *ip*, its coefficient is not significant as indicated by the long-run exclusion test. Furthermore, this is also the case without D94.¹⁹ After imposing the longrun exclusion restriction (and the normalization restriction), the investment relation becomes:

$$ip = 3.15y - 5.20mii$$
 (8.5)

This simple investment equation suggests that private investment is positively affected by output and negatively affected by macroeconomic instability in the long-run. Again, these results are consistent with the theory and the descriptive analysis of the Turkish economy, provided in the previous chapters. Moreover, the above cointegration results suggest that private investment and infrastructural public investment are unrelated and do not possess the complementarity in the long-run.

Finally, it should be noted that the main results in this section also hold when inflation rate is used as a proxy for macroeconomic instability.²⁰

 $^{^{18}\}mathrm{Due}$ to the similar considerations as in the previous analysis D94 enters unrestrictively to the cointegration analysis.

¹⁹Note that, in System #2 without D94, the private investment relation becomes: ip = 3.21y - 0.23igi - 4.45mii. Furthermore, all variables are significant except igi (p-value = 0.11).

²⁰For this purpose an alternative versions of the System #1 and #2 are formed by substituting inflation (dp), i.e. log difference of GNP deflator, for macroeconomic instability (mii). The trace and max statistics suggests one cointegration relation. All variables are found to be significant except ig and igi, respectively. DS80 also found significant in these systems. After imposing the long-run exclusion and normalization restrictions, private investment relations become: ip = 2.55y - 1.50dp - 0.65DS80 and ip = 2.52y - 1.35dp - 0.69DS80, respectively, for an alternative versions of System #1 and #2.

8.3.3 Impulse Response Analyses

This section provides the generalized impulse response (IR) functions (Pesaran and Shin, 1998) to examine the dynamic effects, that is, short and medium-run effects of a shock on a given variable on all the other variables in the system.

Impulse Response Analysis for System #1

In order to assess the dynamic effects of a rise in macroeconomic instability on other variables in the system, the generalized IRs to a positive unit [one standard error (S.E.)] shock in macroeconomic instability (*mii*) equation are examined. These generalized IRs are provided in panel (a) of Figure 8.4. As expected, short and medium-run responses are negative.²¹ That is, private investment, public investment and output are negatively and permanently affected from a rise in macroeconomic instability.²² These results are consistent with the descriptive analysis provided in the previous chapter. Finally, as can be seen from panel (a) of Figure 8.4, the impact effects of a rise in macroeconomic instability on both private and public investments are smaller compared to the medium-term effects; that is, the effect of an increase in macroeconomic instability has an accelerating negative effect on investment, especially, on private investment.

The dynamic effects of a rise in (a positive unit shock to) public investment on other variables in the cointegration system will be examined next. As can be seen from the panel (b) of Figure 8.4, responses of private investment and output are positive; however, the response of the former is much larger. These results suggest a complementarity between public and private investment in the short and the medium-run. Note that, public and private investment moved or "wandered" together, implying complementarity, until the late 1970s (see Figure 8.2)²³ but after the late 1970s this relationship started to

 $^{^{21}}$ However, the effect on private investment and public investment were larger compared to the effect on output.

 $^{^{22}\}ensuremath{\mathrm{These}}$ results are consistent with the theoretical arguments provided in Section 6.3.

 $^{^{23}}$ Also see Chapter 7.

shatter possibly due to a negative effect of chronic macroeconomic instability on both private and public investment but via different channels (and with different magnitudes), as mentioned in the introduction section. Furthermore, this relationship seems to be reversed after the late 1980s, possibly due to rising macroeconomic instability and associated deterioration in fiscal balances, which has affected both public and private investment. Therefore, in the case of Turkey, chronic and increasing macroeconomic instability and associated fiscal problems seems to shatter or even reverse the complementarity between public and private investment in the long-run.²⁴

Furthermore, response of macroeconomic instability to a rise in public investment is initially negative but over the medium-term it diminishes towards zero. This result suggests that the rise in public investment helps to reduce the macroeconomic instability over the short and the medium-term. One potential explanation for this seemingly counterintuitive result is that an increase in public investment in the case of chronic macroeconomic instability and associated fiscal stringency signals a decisive change in fiscal policy, e.g. from populist to productive spending, and could have immediate political credibility and expectation effects which will lower expected inflation, inflation risk on borrowing, and hence macroeconomic instability (see, for example, Alesina *et al.*, 1998; and Perotti, 1999, and the references therein for similar arguments).²⁵ Furthermore, public (and also private) investment affects both the demand and the supply-side of the economy. A rise in public investment increases expenditures of government but the rise in public investment also increases national income and output due to its dual role.

²⁴Metin-Ozcan *et al.* (2001) pointed out the negative effects of domestic debt financing (due to a rise in interest rates), after 1989, on the crowding-in effects of public investment on private investment and output in Turkey.

 $^{^{25}\}mathrm{According}$ to Perotti (1999: 1400), "in times of fiscal stress the economy's response to fiscal shocks changes qualitatively."

(a) Generalized IR(s) to one S.E. shock in the equation for *mii*



(b) Generalized IR(s) to one S.E. shock in the equation for ig



(c) Generalized IR(s) to one S.E. shock in the equation for y



Figure 8.4 Generalized IR(s) to one S.E. shock in the equation for *mii*, *ig* and *y* (System #1)

(a) Generalized IR(s) to one S.E. shock in the equation for *mii*



(b) Generalized IR(s) to one S.E. shock in the equation for igi



(c) Generalized IR(s) to one S.E. shock in the equation for y



Figure 8.5 Generalized IR(s) to one S.E. shock in the equation for *mii*, *igi* and *y* (System #2)

Moreover, given the evidence on the short and medium-term complementarity between public and private investment, a rise in public investment induces a further increase in national income. A rise in national income will, in turn, increase the revenues of government, such as tax and seigniorage revenue, and help to reduce the fiscal deficit and inflation over some period, but with diminishing effects.

Finally, we examine the dynamic effects of a rise in (a positive unit shock to) output on all the other variables. As panel (c) of Figure 8.4 reveals, the short and the medium-run responses of private and public investments to a rise in output is positive as expected. As panel (c) of Figure 8.4 makes clear, the impact effects of a rise in output on both private and public investment are only slightly different than medium-term effects. The short-run responses of macroeconomic instability is negative (e.g. due to the positive effect of a rise in output on revenues of government and, hence, on budget deficit and inflation); however over the medium term this response approaches towards zero.²⁶

Impulse Response Analysis for System #2

Figure 8.5 present the generalized IRs for the System #2. Comparing Figure 8.5 with 8.4 reveals that the generalized IRs of the System #2 is quite similar to that of System #1 hence can be interpreted similarly. However, there is only one considerable difference. In the System #2, infrastructural public investment is more seriously affected from a rise in macroeconomic instability compared to total public investment in the System #1. This is consistent with the observation that Turkey failed to make necessary infrastructural investment due to the constraining effects of macroeconomic instability and associated fiscal problems on the incumbent governments' budgets during the late 1990s, and hence experienced infrastructural bottlenecks, such as energy

 $^{^{26}}$ The dynamic effects of private investment shock are similar to public investment shock on all the other variables (simply replace *ip* with *ig* in panel (b) of Figure 8.4); therefore, it is not separately explained.

bottlenecks, during the late 1990s and the early 2000s.

8.4 Conclusion and Policy Implications

This chapter investigated the empirical relationships between macroeconomic instability, public and private capital accumulation and growth in Turkey over the period 1963-1999. The main conclusion is that the chronic macroeconomic instability of the Turkish economy has seriously affected capital formation and growth. Even though cointegration analyses presented some evidence on the crowding-out effect of total public investment on private investment, there was no significant effect of infrastructural public investment on private investment in the long-run. However, impulse response analyses suggested a complementarity between private and public investment (and with its infrastructural components) over the short and medium-run. All these results (plus the descriptive evidence provided in Chapter 7) imply that the chronic macroeconomic instability seems to become a serious impediment to the public investment, and has shattened, or even reversed, the long-run complementarity. This result may also shed some light on the ambiguity concerning the empirical evidence on complementarity (crowding-in) effect for the Turkish economy. Moreover, given the evidence on the short and medium-term complementarity between public and private investment, these results also imply that macroeconomic instability has been very costly in terms of private capital accumulation and economic growth during the chronic instability episode of Turkey.

The policy implications are straightforward when these results are considered. Generally speaking, over the last twenty-five years, governments in Turkey either delayed or did not continue with the stabilization programs. The barriers to stabilization, such as political instability and polarization, are welldocumented in Veiga (2000) and Drazen (2000) among others. Nevertheless, as this study shows, macroeconomic instability has an adverse impact on capital accumulation and economic growth in Turkey. Therefore, the government should continue the current stabilization program to restore macroeconomic stability, as soon as possible. This is the first policy implication. The second policy implication is that policy makers have to be careful in their decisions concerning the components of public spending that would bear the burden of fiscal adjustment in the process of the restoration of macroeconomic stability. If government reduces public capital spending (especially, infrastructural spending) instead of current and popular spending; then, this would harm capital accumulation, economic growth and development.²⁷ Furthermore, as noted in Section 2.5, fiscal adjustments entailing largely current or social transfer expenditure cuts can be expansionary.

In sum, Turkish experience has shown that macroeconomic instability not only deters economic growth but it may also reverse the complementarity between public and private investment in the long-run.

 $^{^{27}}$ See Sections 2.2 and 6.2 for the crucial importance and the multi-dimensional roles of infrastructure in economic growth and development.

CHAPTER 9

CONCLUSIONS

This conclusion chapter summarizes the main results of both Part I and II and, then, provides the policy implications for Turkey.

Part I has developed a simple macroeconomic framework to provide insights into the understanding of several politico-economic and institutional issues related to fiscal policy making in general and public spending and borrowing in particular. They include the role of political instability on public spending and borrowing decisions and macroeconomic performance; composition of fiscal adjustments; the role of corruption on quality of public investment and macroeconomic performance; and capital borrowing rule.

The main features of the models developed in Part I are that two types of public spending (productive vs. non-productive spending) are distinguished and policy makers' choice for one type of public spending over the other is taken to be determined by a set of political economy factors. This framework is also extended later by incorporating the public borrowing decisions.

The main results of Part I can be summarized as follows: It is shown that the two types of public spending have asymmetric effects on future macroeconomic performance. While productive public spending has favorable effects on output and inflation in the next period, popular (or unproductive) public spending has *un*favorable effects. The interesting result is that the beneficial effects of productive spending are not only limited to output and inflation but also includes future popular spending. Therefore, raising popular spending at the expense of productive spending is associated with a less favorable macroeconomic performance in terms of future output and inflation as well as future popular spending.

Part I has also attempted to provide some political economy explanations to myopic and populist policies and resultant undesirable macroeconomic outcomes. In other words, Part I has investigated the role of socio-political instability on macroeconomic policy making and macroeconomic instability. It is shown that a high level of political instability may lead to myopic policies (via electoral uncertainty) in the form of low level of public investment, and excessive debt accumulation or inefficient budget deficits. Similarly, it is shown that in countries with greater income inequality, social and ethnic fractionalization and the resulting political instability, governments are more likely to opt for popularity-enhancing (non-productive) spending at the expense of cutting back on productivity-enhancing spending such as public investment. Myopic and populist policies, in turn, lead to higher inflation, and lower output and public spending. Thus, such policies result in a worse macroeconomic performance, in the following period. These results are in line with the existing literature but the distinguishing feature of the framework of Part I is that it focuses on the productivity enhancing role of public investment and also links the overall macroeconomic performance to decisions regarding the composition of public spending.

This macroeconomic framework also enabled us to analyze the impact of productivity enhancing public investment on macroeconomic performance both in a centralized and a decentralized policy making structure. The main findings of Part I hold under both centralized and decentralized policy making frameworks. However, an interesting result is that the delegation of monetary policy making to an independent central bank may not necessarily result in better macroeconomic performance (e.g. lower level of inflation), given the importance of favorable effects of productive public spending on future macroeconomic performance and the role of seigniorage as a source of finance, especially in developing countries.

Part I has also provided a political economy explanation for the observed expansionary (Non-Keynesian) output effects of some types of fiscal consolidations. Previous studies on expansionary fiscal contractions suggested several channels for those Non-Keynesian effects, such as the favorable wealth and expectations effects of a cut in public consumption on private consumption. In contrast, this study suggests an alternative channel for Non-Keynesian effects of fiscal adjustments based on the productivity enhancing role of productive public spending. Within the context of the framework of Part I, it is shown that in the event of an incumbent government reducing popular public spending rather than public investment, which is a politically risky option, Non-Keynesian effects are achieved. However, if the incumbent chooses a politically less risky option and reduces public investment instead of popular public spending, the conventional or Keynesian effects are achieved.

Part I also highlighted the importance of the qualitative aspects of fiscal policy for macroeconomic performance. More specifically, this part developed a simple framework to provide insights into the understanding of recently observed empirical regularities on the detrimental effects of corruption on public investment and output performance. It is shown that the size of the favorable effect of public investment on macroeconomic performance depends positively on its quality and hence is inversely related to the level of corruption in the economy.

Additionally, this part has investigated the consequences of productive public spending financed by public borrowing on macroeconomic performance. It is shown that productive spending, e.g. public investment, financed by public borrowing may or may not have favorable effects on the next period's macroeconomic performance. An interesting as well as original result is that the net effect of productive public spending on the next period's macroeconomic performance depends on the benefits of productive public spending relative to the costs of public borrowing. In effect, there are three cases. If the benefits of productive public spending exceeds (falls short of) the costs of borrowing in the next period, then a net effect of current spending on productive public expenditures on the next period's macroeconomic performance is favorable (*un*favorable). Additionally, if the benefits of productive public spending are exactly equal to the costs of borrowing in the next period, then productive public spending committed in the current period has no effect on macroeconomic performance in the next period. In other words, in this case, the net benefit of productive public spending is zero.

Likewise, the implications of a capital borrowing rule on public spending decisions and macroeconomic performance have been investigated. It is shown that even under a capital borrowing rule, higher public investment may yield unfavorable effects on macroeconomic performance in the next period if the benefits of productive public spending are low, e.g. due to low quality, vis-avis it's costs. It is also shown that while the capital borrowing rule prevents strategic debt accumulation, it does not necessarily prevent the strategic use of public investment.

Finally, it should be noted that the framework of Part I can be extended in several ways. For example, an interesting extension of this framework would be to endogenize the probability of electoral success by linking the electoral outcome in the second period to the macroeconomic performance in the first period. In this way, the benefits of popular or non-productive public spending may be even greater in the first (pre-election) period since in this framework while the benefits of popular public spending are enjoyed contemporaneously, the benefits of public investment are enjoyed with a lag.

Part II has investigated the role of macroeconomic instability on public and private capital accumulation and growth in Turkey over the 1963-1999 period. More specifically, Part II has extended recent empirical studies in the literature on the role of public investment in capital accumulation and economic growth, by including macroeconomic instability and considering the Turkish experience. To this end, after providing a detailed descriptive analysis, Part II has investigated the empirical relationships between macroeconomic instability, public investment, private investment and output in Turkey for the 1963-1999 period by using modern time series techniques, such as cointegration and generalized impulse response analyses.

The main results of Part II can be summarized as follows: Both the descriptive and econometric evidence suggests that the chronic and increasing macroeconomic instability of the Turkish economy has seriously affected its capital formation and growth. Furthermore, the Turkish experience indicates that chronic macroeconomic instability seems to be a serious impediment to public investment, especially to its infrastructural component, and shatters, or even reverses, the complementarity between public and private investment in the long-run. These results may also shed some light on the ambiguity concerning the empirical evidence on the complementarity between public and private investment for the Turkish economy. Given the evidence on the short and medium-run complementarity, these results imply that macroeconomic instability has been very costly in terms of private capital accumulation. Thus, the main conclusion from Part II is that macroeconomic instability not only deters economic growth but it may also reverse the complementarity between public and private investment in the long-run. However, in order to shed more light on this result, this study can be further extended to other developing countries suffering from chronic instability like Turkey and this is left for future research.

Nevertheless, the following final remarks can be made from the Turkish

experience. Chronic macroeconomic instability and recurrent crises have been very costly for both the Turkish economy and the Turkish politics, in the sense that Turkey has not realized its full economic potential and Turkish citizens have not reaped the fruits of the resultant economic prosperity. Furthermore, as it is evident from the experiences of the recent years, macroeconomic instability aggravated fiscal stringency (mainly due to the heavy debt burden) which in turn prevented the government from engaging in productive public spending, such as spending on basic infrastructure, education and health that are believed to be crucial for long-term growth and development.

Finally, the policy implications for Turkey can be summarized as follows: First, the implementation of the current stabilization program should be continued to restore macroeconomic stability, which is a pre-condition for sustainable economic growth. Second, the policy makers should be more sensitive in their decisions regarding the components of public spending that would bear the burden of fiscal adjustment in the process of the restoration of macroeconomic stability. But along with the stabilization efforts, the current government should also raise the quality of public investment, for example, by taking necessary measures to alleviate (or eliminate) the detrimental effects of corruption and favoritism on the productivity of public investment.

APPENDICES

APPENDIX A

DERIVATION OF OUTPUT SUPPLY FUNCTION

Output is given by the following production function:

$$Y_t = N_t^{\gamma},\tag{1}$$

where Y_t and N_t represent output and labor in period t, and $0 < \gamma < 1$. Distortionary taxes, which are the only form of taxes available to the government, are levied on output at the rate τ_t . A representative competitive firm's problem is to maximize profits $P_t N_t^{\gamma}(1 - \tau_t) - W_t N_t$, where P_t and W_t represent price level and the wage rate in period t. A representative competitive firm chooses labor N_t to maximize profits by taking P_t and W_t as given. The resulting (log) output supply function is $y_t = \alpha(p_t - w_t - \tau_t) + z$, where lower case letters represent logs, e.g. $y_t = \ln(Y_t)$, $\alpha = \gamma/(1 - \gamma)$, $z = \alpha \ln(\gamma)$ and $\ln(1 - \tau)$ is approximated with $-\tau$. Normalizing output by subtracting the constant term $z = \alpha \ln(\gamma)$ from y_t yield the normalized output supply function $x_t = \alpha(p_t - w_t - \tau_t)$. Utilizing $w_t = p_t^e$, where superscripts e denote expectation,¹ yield the output supply function in Equation (3.1).

¹This condition implies that workers or centralized trade union set the nominal (log) wage to expected (log) price level. However, workers, via trade union, may set the nominal (log) wage w to achieve (log) target real wage v, i.e. $w_t = p_t^e + v$ (see, for instance, Alesina and Tabellini, 1987: 621-2, for more detail). In the above case, for the sake of simplicity, v is normalized to zero. This assumption does not affect qualitative nature of the results and it is also made by Beetsma and Bovenberg (1997a, 1997b, 1999) among others with similar claim.

APPENDIX B

DERIVATION OF THE BUDGET CONSTRAINT

Equation (3.3) is derived as follows (see Alesina and Tabellini, 1987; and Beetsma and Bovenberg, 1999, for more detail). First of all, the government budget constraint is stated in nominal terms:

$$P_t G_t = \tau_t P_t X_t + \Delta M_t \tag{2}$$

where G_t represents real government spending, M_t represents money supply, and other terms are as defined earlier (see Appendix A).

Now, dividing both sides of the above equation with nominal income $P_t X_t$ gives the following

$$g_t = \tau_t + \frac{\Delta M_t}{P_t X_t}.$$
(3)

Money demand equation is based on a simple quantity theory framework,

$$M_t = k P_t \mathbf{\hat{X}},\tag{4}$$

where \hat{X} is some measure of (real) output, which is independent of tax rate τ_t , and $k \ge 0$. Thus, total seigniorage revenue $\frac{\Delta M_t}{P_t}$ is given by

$$\frac{\Delta M_t}{P_t} = \pi_t k \mathbf{\hat{X}} \tag{5}$$

where $\pi_t = \frac{\Delta P_t}{P_t}$.

By utilizing the above equation and approximating \Re with X_t , as with the most of the literature noted in the text, Equation (3) can be re-expressed as follows

$$g_t = \tau_t + k\pi_t. \tag{6}$$

Similarly, by following most of the literature (including Alesina and Tabellini, 1987; Jensen, 1994; Debelle and Fischer, 1994; and Ozkan, 1998, 2000), and assuming k = 1 for simplicity, Equation (3.3) is obtained.

APPENDIX C

DERIVATION OF THE POLICY OUTCOMES OF THE BENCHMARK MODEL

In this set-up, the central policy maker minimizes the Loss function subject to the constraints; namely, budget constraint and output supply function.² Therefore, by substituting output supply function into the loss function, the Lagrangean of the policy maker can be written as follows

$$\$ = \frac{1}{2} [\delta_1 \pi_t^2 + (\alpha (\pi_t - \pi_t^e - \tau_t) - \overline{x}_t)^2 + \delta_2 (g_t - \overline{g}_t)^2] + \lambda (g_t - \tau_t - \pi_t) \quad (7)$$

where λ is the Lagrange multiplier related to the budget constraint of the central policy maker.

The first-order conditions (FOCs)³ for π , τ and g can be written as follows, respectively:

$$\delta_1 \pi_t + \alpha (\alpha (\pi_t - \pi_t^e - \tau_t) - \overline{x}_t) = \lambda \tag{8}$$

$$-\alpha(\alpha(\pi_t - \pi_t^e - \tau_t) - \overline{x}_t) = \lambda \tag{9}$$

 $^{^{2}}$ The timing of events is important. In this set-up (and also in the dynamic set-up), central policy maker acts after the nominal wages are set, as is standard in policy games literature.

 $^{^{3}}$ FOCs are both necessary and sufficient for the optimum due to the quadratic-linear set-up.

$$\delta_2(\overline{g}_t - g_t) = \lambda \tag{10}$$

By eliminating λ from the above system and imposing rational expectations condition (i.e. $\pi_t^e = \pi_t$), the following is obtained

$$\pi_t = \frac{2\alpha}{\delta_1} (\alpha \tau_t + \overline{x}_t) \tag{11}$$

$$(\overline{g}_t - g_t) = \frac{\alpha}{\delta_2} (\alpha \tau_t + \overline{x}_t) \tag{12}$$

Combining the above two equations with the budget constraint (and output supply function) gives us the equilibrium policies appearing in the text [Equations (3.4)-(3.7)].

APPENDIX D

DERIVATION OF AUGMENTED OUTPUT SUPPLY FUNCTION

Output is given by the following production function:

$$Y_t = A_t N_t^{\gamma},\tag{13}$$

where A_t represents the level of productivity in period t, $0 < \gamma < 1$ and other variables are as defined in Appendix A. Again, distortionary taxes are levied on output at the rate τ_t . In this case, a representative competitive firm's problem is to maximize profits

$$P_t(1-\tau_t)A_tN_t^{\gamma} - W_tN_t. \tag{14}$$

A representative competitive firm chooses labor N_t to maximize profits by taking P_t , W_t and A_t as given. The resulting (log) output supply function is

$$y_t = \alpha (p_t + \frac{1}{\gamma}a_t - w_t - \tau_t) + z, \qquad (15)$$

where all variables are as defined in Appendix A.

As mentioned in the text, in this set-up it is assumed that the previous period's productive public spending (g^p) enhances the current period's productivity level. More formally, (log) productivity is modelled as follows:

$$a_t = a_0 + \zeta g_{t-1}^p, \tag{16}$$

where ζ is productivity coefficient measuring extent by which one period's productive public spending improves the (log) productivity in the following period and $\zeta > 0$.

Substituting Equation (16) into (15); then, normalizing output by subtracting the constant term $z' = z + \alpha a_0/\gamma$ for simplicity and finally utilizing $w_t = p_t^e$ as in Appendix A, yields the augmented (normalized) output supply function in Equation (3.8).

APPENDIX E

DERIVATION OF THE EQUILIBRIUM POLICY OUTCOMES OF THE BASIC DYNAMIC MODEL

As mentioned before, in this two-period set-up, equilibrium outcomes are derived by backwards induction. Therefore, for a given g_1^p , policy outcomes and welfare losses for t = 2 are derived first. Then, equilibrium outcomes for t = 1 are derived.

Solution in t = 2

Solution in the final period (t = 2) is similar to the benchmark case. For a given g_1^p , the central policy maker minimizes its in-period losses subject to the budget constraint and output supply function, and with respect to π_2, τ_2 and g_2^{np} (recall that g^p is not among the choice variables in t = 2).

Therefore, by substituting output supply function into the loss function (in t = 2), the final-period Lagrangean of the policy maker can be written as follows

$$\$_{2} = \frac{1}{2} \left[\delta_{1} \pi_{2}^{2} + \left(\alpha (\pi_{2} + \rho g_{1}^{p} - \pi_{2}^{e} - \tau_{2}) - \overline{x}_{2} \right)^{2} + \delta_{2} (g_{2}^{np} - \overline{g}_{2}^{np})^{2} \right] + \lambda_{2} (g_{2}^{np} - \tau_{2} - \pi_{2})$$
(17)

where λ_2 is the Lagrange multiplier related to the budget constraint of the central policy maker in the final period.

The FOCs for π_2 , τ_2 and g_2^{np} can be written as follows, respectively:

$$\delta_1 \pi_2 + \alpha (\alpha (\pi_2 + \rho g_1^p - \pi_2^e - \tau_2) - \overline{x}_2) = \lambda_2$$
(18)

$$-\alpha(\alpha(\pi_2 + \rho g_1^p - \pi_2^e - \tau_2) - \overline{x}_2) = \lambda_2 \tag{19}$$

$$\delta_2(\overline{g}_2^{np} - g_2^{np}) = \lambda_2 \tag{20}$$

By eliminating λ_2 from the above system and imposing RE condition (i.e. $\pi_2^e = \pi_2$), the following is obtained

$$\pi_2 = \frac{2\alpha}{\delta_1} (\alpha \tau_2 + \overline{x}_2 - \alpha \rho g_1^p) \tag{21}$$

$$(\overline{g}_2 - g_2) = \frac{\alpha}{\delta_2} (\alpha \tau_2 + \overline{x}_2 - \alpha \rho g_1^p)$$
(22)

Combining the above two equations with budget constraint and output supply function the optimal policy outcomes for the second period is found, for a given g_1^p [See Table 3.2]. Substituting these optimal policy outcomes into the Loss function, a final period loss of $(\delta_2/2)D(\overline{x}_2/\alpha + \overline{g}_2^{np} - \rho g_1^p)^2$ is obtained, where $D = (2\delta_2/\delta_1)\Psi^2 + \Psi$. Note that this is smaller than the losses achieved in the benchmark case with no productivity effect, which is given by $(\delta_2/2)D(\overline{x}_2/\alpha + \overline{g}_2)^2$ for t = 2.

Solution in t = 1

In the first period (t = 1), the central policy maker minimizes its intertemporal loss function with respect to π_1 , τ_1 , g_1^{np} and g_1^p . Formally, by substituting
equilibrium values from t = 2 and output supply function (in t = 1)⁴ into the intertemporal loss function, the first-period Lagrangean of the policy maker can be written as follows

$$\begin{aligned} \$_{1} &= \frac{1}{2} \left[\delta_{1} \pi_{1}^{2} + \left(\alpha (\pi_{1} - \pi_{1}^{e} - \tau_{1}) - \overline{x}_{1} \right)^{2} + \delta_{2} (g_{1}^{np} - \overline{g}_{1}^{np})^{2} + \delta_{3} (g_{1}^{p} - \overline{g}_{1}^{p})^{2} \right] \\ &+ \beta_{G} (\delta_{2}/2) D(\overline{x}_{2}/\alpha + \overline{g}_{2}^{np} - \rho g_{1}^{p})^{2} + \lambda_{1} (g_{1}^{np} + g_{1}^{p} - \tau_{1} - \pi_{1}) \end{aligned}$$
(23)

where λ_1 is the Lagrange multiplier related to the budget constraint of the central policy maker in the first period.

The FOCs for π_1, τ_1, g_1^{np} and g_1^p can be written as follows, respectively:

$$\delta_1 \pi_1 + \alpha (\alpha (\pi_1 - \pi_1^e - \tau_1) - \overline{x}_1) = \lambda_1 \tag{24}$$

$$-\alpha(\alpha(\pi_1 - \pi_1^e - \tau_1) - \overline{x}_1) = \lambda_1 \tag{25}$$

$$\delta_2(\overline{g}_1^{np} - g_1^{np}) = \lambda_1 \tag{26}$$

$$\delta_3(\overline{g}_1^p - g_1^p) + \rho \beta_G \delta_2 D(\overline{x}_2/\alpha + \overline{g}_2^{np} - \rho g_1^p) = \lambda_1$$
(27)

After eliminating λ_1 from the above system and imposing rational expectations condition (i.e. $\pi_1^e = \pi_1$), the relevant equations are combined with budget constraint and output supply function to find equilibrium values for the first period appearing in Table 3.2.

⁴Note that in our two-period set-up, g_0^p is not included in the output supply function in t = 1: $\alpha(\pi_1 - \pi_1^e - \tau_1)$. Nevertheless, our main results in this chapter would not change if we consider the following supply function in t = 1: $\alpha(\pi_1 + \rho g_0^p - \pi_1^e - \tau_1)$.

APPENDIX F

DERIVATION OF THE POLICY OUTCOMES OF THE DECENTRALIZED BENCHMARK MODEL

In this decentralized policy making framework, fiscal authority (government) and independent central bank (CB) plays a one-shot Nash game. Therefore, after the nominal wages are set, both fiscal and monetary authority act simultaneously and non-cooperatively to choose their respective instruments.

Formally speaking, central bank optimally selects its policy by minimizing its Loss function [Equation (3.11)] subject to the output supply function [Equation (3.1)] and with respect to π , taking the government's action and expectations as given. Hence, CB minimizes the following expression with respect to π

$$\frac{1}{2} [\mu_1 \pi_t^2 + (\alpha (\pi_t - \pi_t^e - \tau_t) - \overline{x}_t)^2 + \mu_2 (g_t - \overline{g}_t)^2]$$
(28)

The first-order condition for π yields the following equation, which is CB's reaction function,

$$\pi_t = \frac{\alpha}{\mu_1 + \alpha^2} [\alpha(\pi_t^e + \tau_t) + \overline{x}_t]$$
(29)

Similarly, the fiscal authority minimizes the Loss function [Equation (3.2)], by taking central bank's action and expectations as given, subject to the constraints; namely, budget constraint and output supply function, and with respect to τ and g. Therefore, by substituting output supply function into the loss function, the Lagrangean of the policy maker can be written as follows

$$\$ = \frac{1}{2} [\delta_1 \pi_t^2 + (\alpha (\pi_t - \pi_t^e - \tau_t) - \overline{x}_t)^2 + \delta_2 (g_t - \overline{g}_t)^2] + \lambda (g_t - \tau_t - \pi_t) \quad (30)$$

where λ is the Lagrange multiplier related to the budget constraint of the fiscal authority.

The FOCs for τ and g can be written as follows, respectively:

$$-\alpha(\alpha(\pi_t - \pi_t^e - \tau_t) - \overline{x}_t) = \lambda \tag{31}$$

$$\delta_2(\overline{g}_t - g_t) = \lambda \tag{32}$$

By eliminating λ from the above two-equation system, the following equation is obtained

$$(\overline{g}_t - g_t) = -\frac{\alpha}{\delta_2} [\alpha(\pi_t - \pi_t^e - \tau_t) - \overline{x}_t]$$
(33)

Combining the above equation with the budget constraint, the government's reaction function is obtained,

$$\tau_t = \frac{1}{\delta_2 + \alpha^2} [(\alpha^2 - \delta_2)\pi_t - \alpha^2 \pi_t^e - \alpha \overline{x}_t + \delta_2 \overline{g}_t]$$
(34)

After imposing the rational expectations condition (i.e. $\pi_t^e = \pi_t$) on the above two reaction functions, equilibrium values of π and τ are obtained by

substituting relevant reaction function into each other. Similarly, the equilibrium values of g and x are arrived at by using the budget constraint and output supply function. These results appear in Table 3.6.

APPENDIX G

DERIVATION OF THE EQUILIBRIUM POLICY OUTCOMES OF THE BASIC DYNAMIC MODEL UNDER ELECTORAL UNCERTAINTY

In the two-period set-up, equilibrium outcomes are derived by backwards induction as in Appendix E. Therefore, for a given g_1^p , policy outcomes and welfare losses for t = 2 are derived first. Then, equilibrium outcomes for t = 1are derived.

Solution in t = 2

As elections are held at the end of t = 1 all policy decisions in t = 2 are taken as in Appendix E (i.e. in the absence of electoral uncertainty) and the optimal policy outcomes for the second period, for a given g_1^p , are the same as in Table 3.2 of the previous chapter. (see Appendix E and Table 3.2 of the previous chapter for more detail)

Solution in t = 1

In the first period (t = 1), the central policy maker minimizes its intertemporal loss function with respect to π_1 , τ_1 , g_1^{np} and g_1^p . Formally, by substituting equilibrium values from t = 2 and output supply function (in t = 1) into the intertemporal loss function, the first-period Lagrangean of the policy maker can be written as follows

$$\$_1 = \frac{1}{2} \left[\delta_1 \pi_1^2 + (\alpha (\pi_1 - \pi_1^e - \tau_1) - \overline{x}_1)^2 + \delta_2 (g_1^{np} - \overline{g}_1^{np})^2 + \delta_3 (g_1^p - \overline{g}_1^p)^2 \right]$$

$$+p\beta_G(\delta_2/2)D(\overline{x}_2/\alpha + \overline{g}_2^{np} - \rho g_1^p)^2 + \lambda_1(g_1^{np} + g_1^p - \tau_1 - \pi_1)$$
(35)

where λ_1 is Lagrange multiplier related to the budget constraint of the central policy maker in the first period.

The FOCs for π_1 , τ_1 , g_1^{np} and g_1^p can be written as follows, respectively:

$$\delta_1 \pi_1 + \alpha (\alpha (\pi_1 - \pi_1^e - \tau_1) - \overline{x}_1) = \lambda_1 \tag{36}$$

$$-\alpha(\alpha(\pi_1 - \pi_1^e - \tau_1) - \overline{x}_1) = \lambda_1 \tag{37}$$

$$\delta_2(\overline{g}_1^{np} - g_1^{np}) = \lambda_1 \tag{38}$$

$$\delta_3(\overline{g}_1^p - g_1^p) + \rho p \beta_G \delta_2 D(\overline{x}_2/\alpha + \overline{g}_2^{np} - \rho g_1^p) = \lambda_1 \tag{39}$$

After eliminating λ_1 from the above system and imposing rational expectations condition (i.e. $\pi_1^e = \pi_1$), the relevant equations are combined with budget constraint and output supply function to find the equilibrium values for the first period appearing in Table G.1.

Table G.1. Equilibrium Macroeconomic Outcome Under Electoral Uncertainty in t = 1 and t = 2

| $g_1^{p,E} = \Theta^* [\frac{\delta_3}{\delta_2 \Psi} \overline{g}_1^p - \overline{g}_1^{np} + \Gamma^* \overline{g}_2^{np} - \frac{1}{\alpha} \overline{x}_1 + \frac{\Gamma^*}{\alpha} \overline{x}_2]$ |
|--|
| $g_1^{np,E} = -\frac{\delta_3}{\delta_2} \Theta^* \overline{g}_1^p + (1 - \Phi^*) \overline{g}_1^{np} - \Lambda^* \Theta^* \overline{g}_2^{np} - \frac{1}{\alpha} \Phi^* \overline{x}_1 - \Lambda^* \Theta^* \frac{1}{\alpha} \overline{x}_2$ |
| $\pi_1^E = \frac{2\delta_2}{\delta_1} \left[\frac{\delta_3}{\delta_2} \Theta^* \overline{g}_1^p + \Phi^* \overline{g}_1^{np} + \Lambda^* \Theta^* \overline{g}_2^{np} + \Phi^* \frac{1}{\alpha} \overline{x}_1 + \Lambda^* \Theta^* \frac{1}{\alpha} \overline{x}_2 \right]$ |
| $x_1^E = -\frac{\delta_2}{\alpha} [\frac{\delta_3}{\delta_2} \Theta^* \overline{g}_1^p + \Phi^* \overline{g}_1^{np} + \Lambda^* \Theta^* \overline{g}_2^{np} + \Lambda^* \Theta^* \frac{1}{\alpha} \overline{x}_2] + \Upsilon^* \overline{x}_1$ |
| $\tau_1^E = \frac{\delta_2}{\alpha^2} \left[\frac{\delta_3}{\delta_2} \Theta^* \overline{g}_1^p + \Phi^* \overline{g}_1^{np} + \Lambda^* \Theta^* \overline{g}_2^{np} + \Lambda^* \Theta^* \frac{1}{\alpha} \overline{x}_2 \right] - \Upsilon^* \frac{1}{\alpha} \overline{x}_1$ |
| $g_2^{np} = \Psi(\phi + \rho\Gamma^*\Theta^*)\overline{g}_2^{np} - \frac{1}{\alpha}\Psi\Xi^*\overline{x}_2 + \rho\Psi[\frac{\delta_3}{\delta_2\Psi}\Theta^*\overline{g}_1^p - \Theta^*\overline{g}_1^{np} - \Theta^*\frac{1}{\alpha}\overline{x}_1]$ |
| $\pi_2^E = \frac{2\delta_2}{\delta_1} \Psi \Xi^* [\frac{1}{\alpha} \overline{x}_2 + \overline{g}_2^{np}] - \rho \frac{2\delta_2}{\delta_1} \Psi [\frac{\delta_3}{\delta_2 \Psi} \Theta^* \overline{g}_1^p - \Theta^* \overline{g}_1^{np} - \Theta^* \frac{1}{\alpha} \overline{x}_1]$ |
| $x_2^E = (Z + \frac{\delta_2}{\alpha^2} \Psi \rho \Gamma^* \Theta^*) \overline{x}_2 - \frac{\delta_2}{\alpha} \Psi \Xi^* \overline{g}_2^{np} + \frac{\delta_2}{\alpha} \Psi \rho [\frac{\delta_3}{\delta_2 \Psi} \Theta^* \overline{g}_1^p - \Theta^* \overline{g}_1^{np} - \Theta^* \frac{1}{\alpha} \overline{x}_1]$ |
| $\tau_{2}^{E} = \left(\frac{\delta_{2}}{\alpha^{2}}\Psi + \rho\Gamma^{*}\Theta^{*}Z\right)\overline{g}_{2}^{np} - Z\Xi^{*}\frac{1}{\alpha}\overline{x}_{2} + \rhoZ\left[\frac{\delta_{3}}{\delta_{2}\Psi}\Theta^{*}\overline{g}_{1}^{p} - \Theta^{*}\overline{g}_{1}^{np} - \Theta^{*}\frac{1}{\alpha}\overline{x}_{1}\right]$ |

$$\begin{split} \text{Note:} \ \phi &= \frac{\delta_2}{\alpha^2} + \frac{2\delta_2}{\delta_1}, \Psi = \frac{1}{(1+\phi)}, \mathsf{Z} = (1 - \frac{\delta_2}{\alpha^2}\Psi) > 0, D = \frac{2\delta_2}{\delta_1}\Psi^2 + \Psi, \beta_G^* = \\ p\beta_G, \Lambda^* &= \rho\beta_G^*D, \ \Gamma^* = \frac{\Lambda^*}{\Psi} = \frac{\rho\beta_G^*}{\Psi}D, \\ \Theta^* &= \frac{1}{(1+\Omega^*)}, \Omega^* = \frac{(\frac{\delta_3}{\delta_2} + \rho\Lambda^*)}{\Psi}, 0 < \Phi^* = \\ \frac{\Psi\Omega^*}{(1+\Omega^*)} < 1, \\ \Xi^* &= 1 - \rho\Theta^*\Gamma^* > 0, \\ \Upsilon^* &= \overset{\mathsf{i}}{1} - \frac{\delta_2}{\alpha^2}\Phi^* > 0. \end{split}$$

APPENDIX H

DERIVATION OF THE NEW BUDGET CONSTRAINT

Equation (5.3) can derived by following the similar steps as in Appendix B (See, Beetsma and Bovenberg (1999) for more detail). First of all, the new government budget constraint in nominal terms is stated:

$$P_t G_t^{np} + (1 + r_{t-1}) P_t D_{t-1} = \tau_t P_t X_t + \Delta M_t + P_t D_t \tag{40}$$

where G_t^{np} represents the real (non-productive) government spending, D_{t-1} denotes the real value of single-period indexed public debt issued in period t-1(i.e. public debt issued in period t-1 matures in one period and paid back at the end of period t), r_{t-1} represents the real interest rate in period t-1 and D_t represents the real value of new debt issue in period t, and all the other variables are as defined before (see Appendices A and B).

Now, dividing both sides of the above equation with nominal income $P_t X_t$ gives the following

$$g_t^{np} + (1 + r_{t-1})d_{t-1} = \tau_t + d_t + \frac{\Delta M_t}{P_t X_t}$$
(41)

Assuming that money demand equation is based on a simple quantity theory framework (i.e. $M_t = k P_t \hat{X}$) as in Appendix B and following the rest of the steps therein leads to Equation (5.3).

APPENDIX I

DERIVATION OF THE EQUILIBRIUM POLICY OUTCOMES OF AN EXTENDED BENCHMARK MODEL WITH DEBT DYNAMICS

In this two-period set-up, equilibrium outcomes are derived by backwards induction as in Appendix E.

Solution in t = 2

Solution in t = 2 is similar to the basic dynamic model. That is, d_2 is not among the choice variables in t = 2; therefore, for a given d_1 , the central policy maker minimizes its in-period losses subject to the budget constraint and output supply function, and with respect to π_2, τ_2 and g_2^{np} . Thus, by substituting output supply function into the loss function, the final-period Lagrangean of the policy maker can be written as follows

$$\$_{2} = \frac{1}{2} \left[\delta_{1} \pi_{2}^{2} + \left(\alpha (\pi_{2} - \pi_{2}^{e} - \tau_{2}) - \overline{x}_{2} \right)^{2} + \delta_{2} (g_{2}^{np} - \overline{g}_{2}^{np})^{2} \right] + \lambda_{2} (g_{2}^{np} + (1 + r_{1})d_{1} - \tau_{2} - \pi_{2})$$
(42)

where λ_2 is the Lagrange multiplier related to the budget constraint of the central policy maker in the final period.

The FOCs for π_2 , τ_2 and g_2^{np} can be written as follows, respectively:

$$\delta_1 \pi_2 + \alpha (\alpha (\pi_2 - \pi_2^e - \tau_2) - \overline{x}_2) = \lambda_2 \tag{43}$$

$$-\alpha(\alpha(\pi_2 - \pi_2^e - \tau_2) - \overline{x}_2) = \lambda_2 \tag{44}$$

$$\delta_2(\overline{g}_2^{np} - g_2^{np}) = \lambda_2 \tag{45}$$

By eliminating λ_2 from the above system and imposing rational expectations condition (i.e. $\pi_2^e = \pi_2$), the following is obtain

$$\pi_2 = \frac{2\alpha}{\delta_1} (\alpha \tau_2 + \overline{x}_2) \tag{46}$$

$$(\overline{g}_2 - g_2) = \frac{\alpha}{\delta_2} (\alpha \tau_2 + \overline{x}_2) \tag{47}$$

Combining the above two equations with budget constraint and output supply function yields the optimal policy outcomes for the second period, for a given d_1 (see Table 5.1). By substituting these optimal policy outcomes into the Loss function, a final period loss of $(\delta_2/2)D(\overline{x}_2/\alpha + \overline{g}_2^{np} + (1+r_1)d_1)^2$ is obtained, where $D = (2\delta_2/\delta_1)\Psi^2 + \Psi$.

Solution in t = 1

In the first period (t = 1), the central policy maker minimizes its intertemporal loss function with respect to π_1 , τ_1 , g_1^{np} and d_1 . Formally, by substituting equilibrium values from t = 2 and output supply function (in $t = 1)^5$ into the intertemporal loss function, the first-period Lagrangean of the policy maker can be written as follows

⁵Note that in this two-period set-up, d_0 is not included in the budget constraint of the central policy maker in t = 1 (Recall that g_0^p is not included in the supply function in the basic dynamic model of Chapter 3). However, qualitative nature of our results would not change.

$$\$_{1} = \frac{1}{2} [\delta_{1} \pi_{1}^{2} + (\alpha (\pi_{1} - \pi_{1}^{e} - \tau_{1}) - \overline{x}_{1})^{2} + \delta_{2} (g_{1}^{np} - \overline{g}_{1}^{np})^{2}] + \beta_{G} (\delta_{2}/2) D (\overline{x}_{2}/\alpha + \overline{g}_{2}^{np} + (1 + r_{1})d_{1})^{2} + \lambda_{1} (g_{1}^{np} - \tau_{1} - \pi_{1} - d_{1})$$
(48)

where λ_1 is the Lagrange multiplier related to the budget constraint of the central policy maker in the first period.

The FOCs for π_1 , τ_1 , g_1^{np} and d_1 can be written as follows, respectively:

$$\delta_1 \pi_1 + \alpha (\alpha (\pi_1 - \pi_1^e - \tau_1) - \overline{x}_1) = \lambda_1$$
(49)

$$-\alpha(\alpha(\pi_1 - \pi_1^e - \tau_1) - \overline{x}_1) = \lambda_1 \tag{50}$$

$$\delta_2(\overline{g}_1^{np} - g_1^{np}) = \lambda_1 \tag{51}$$

$$(1+r_1)\beta_G\delta_2 D(\overline{x}_2/\alpha + \overline{g}_2^{np} + (1+r_1)d_1) = \lambda_1$$
(52)

After eliminating λ_1 from the above system and imposing rational expectations condition (i.e. $\pi_1^e = \pi_1$), the relevant equations are combined with budget constraint and output supply function to find equilibrium values for the first period appearing in Table 5.2.

APPENDIX J

DERIVATION OF THE EQUILIBRIUM POLICY OUTCOMES OF THE DOUBLE DYNAMICS MODEL

Equilibrium outcomes are derived by backwards induction as in Appendices E and I.

Solution in t = 2

In t = 2, for a given values of d_1 and g_1^p , the central policy maker minimizes its in-period losses subject to the budget constraint and output supply function, and with respect to π_2, τ_2 and g_2^{np} (Recall that d_1 and g_1^p are not among the choice variables in t = 2). By substituting output supply function into the loss function, the final-period Lagrangean of the policy maker can be written as follows

$$\$_{2} = \frac{1}{2} \left[\delta_{1} \pi_{2}^{2} + \left(\alpha (\pi_{2} + \rho g_{1}^{p} - \pi_{2}^{e} - \tau_{2}) - \overline{x}_{2} \right)^{2} + \delta_{2} (g_{2}^{np} - \overline{g}_{2}^{np})^{2} \right] \\ + \lambda_{2} (g_{2}^{np} + (1 + r_{1})d_{1} - \tau_{2} - \pi_{2})$$
(53)

where λ_2 is the Lagrange multiplier related to the budget constraint of the central policy maker in the final period.

The FOCs for π_2 , τ_2 and g_2^{np} can be written as follows, respectively:

$$\delta_1 \pi_2 + \alpha (\alpha (\pi_2 + \rho g_1^p - \pi_2^e - \tau_2) - \overline{x}_2) = \lambda_2$$
(54)

$$-\alpha(\alpha(\pi_2 + \rho g_1^p - \pi_2^e - \tau_2) - \overline{x}_2) = \lambda_2$$
(55)

$$\delta_2(\overline{g}_2^{np} - g_2^{np}) = \lambda_2 \tag{56}$$

By following the same steps as in Appendices E and I, optimal policy outcomes for the second period are attained, for a given levels of d_1 and g_1^p (see Table 5.5). By substituting these optimal policy outcomes into the Loss function, a final period loss of $(\delta_2/2)D(\overline{x}_2/\alpha + \overline{g}_2^{np} + (1+r_1)d_1 - \rho g_1^p)^2$ is obtained, where $D = (2\delta_2/\delta_1)\Psi^2 + \Psi$.

Solution in t = 1

In t = 1, the central policy maker minimizes its intertemporal loss function with respect to π_1 , τ_1 , g_1^{np} , g_1^p and d_1 . Formally, by substituting equilibrium values from t = 2 and output supply function (in t = 1)⁶ into the intertemporal loss function, the first-period Lagrangean of the policy maker can be written as follows

$$\$_{1} = \frac{1}{2} [\delta_{1}\pi_{1}^{2} + (\alpha(\pi_{1} - \pi_{1}^{e} - \tau_{1}) - \overline{x}_{1})^{2} + \delta_{2}(g_{1}^{np} - \overline{g}_{1}^{np})^{2} + \delta_{3}(g_{1}^{p} - \overline{g}_{1}^{p})^{2}] + \beta_{G}(\delta_{2}/2)D(\overline{x}_{2}/\alpha + \overline{g}_{2}^{np} + (1 + r_{1})d_{1} - \rho g_{1}^{p})^{2} + \lambda_{1}(g_{1}^{np} + g_{1}^{p} - \tau_{1} - \pi_{1} - d_{1})$$
(57)

where λ_1 is the Lagrange multiplier related to the budget constraint of the central policy maker in the first period.

⁶Note that, as before d_0 and g_0^p are not included in t = 1, which would not change qualitative nature of the results.

The FOCs for $\pi_1, \tau_1, g_1^{np}, g_1^p$ and d_1 can be written as follows, respectively:

$$\delta_1 \pi_1 + \alpha (\alpha (\pi_1 - \pi_1^e - \tau_1) - \overline{x}_1) = \lambda_1 \tag{58}$$

$$-\alpha(\alpha(\pi_1 - \pi_1^e - \tau_1) - \overline{x}_1) = \lambda_1 \tag{59}$$

$$\delta_2(\overline{g}_1^{np} - g_1^{np}) = \lambda_1 \tag{60}$$

$$\delta_3(\overline{g}_1^p - g_1^p) + \delta_2 \rho \beta_G D(\overline{x}_2/\alpha + \overline{g}_2^{np} + (1+r_1)d_1 - \rho g_1^p) = \lambda_1 \tag{61}$$

$$\delta_2(1+r_1)\beta_G D(\overline{x}_2/\alpha + \overline{g}_2^{np} + (1+r_1)d_1 - \rho g_1^p) = \lambda_1$$
(62)

After eliminating λ_1 from the above system and imposing rational expectations condition (i.e. $\pi_1^e = \pi_1$), the relevant equations are combined with budget constraint and output supply function to find equilibrium values for the first period appearing in Table 5.6.

APPENDIX K

DATA APPENDIX

Data

| Year | Y (real) | lp (real) | lg (real) | lgi (real) | lgni (real) | MII | Р |
|------|--------------|--------------|-------------|-------------|-------------|------------|---------------|
| 1963 | 1003424.0327 | 105621.9706 | 56968.7699 | 21017.5696 | 35951.2003 | 0.01946148 | 0.00969915 |
| 1964 | 1044319.8891 | 91790.7250 | 62517.6061 | 20471.7533 | 42045.8527 | 0.04799916 | 0.00994870 |
| 1965 | 1077078.7669 | 100312.8357 | 66183.2723 | 20899.3534 | 45283.9190 | 0.05111184 | 0.01037837 |
| 1966 | 1206235.8719 | 114321.7995 | 80962.8935 | 26174.7615 | 54788.1319 | 0.03535720 | 0.01104172 |
| 1967 | 1256964.7552 | 134309.5715 | 85769.5712 | 28947.4941 | 56822.0771 | 0.02939358 | 0.01176231 |
| 1968 | 1340788.6269 | 153921.8951 | 103174.7981 | 35115.7452 | 68059.0529 | 0.04033353 | 0.01222360 |
| 1969 | 1398742.1099 | 181936.2735 | 112970.9555 | 38145.1562 | 74825.7993 | 0.05980208 | 0.01310865 |
| 1970 | 1460877.2182 | 203787.9763 | 120368.6543 | 43523.8556 | 76844.7988 | 0.09343285 | 0.01422535 |
| 1971 | 1563814.5950 | 193218.9867 | 110886.3070 | 39202.1485 | 71684.1584 | 0.19644999 | 0.01669460 |
| 1972 | 1707147.7932 | 234565.5282 | 122688.6876 | 40510.0710 | 82178.6166 | 0.05457774 | 0.01840143 |
| 1973 | 1790885.9062 | 264200.3612 | 135592.9904 | 50118.4181 | 85474.5724 | 0.09165057 | 0.02228442 |
| 1974 | 1849296.5149 | 263913.8380 | 157607.9345 | 61879.9424 | 95727.9921 | 0.10019600 | 0.02907471 |
| 1975 | 1961282.1554 | 304086.2233 | 220269.3078 | 78540.8191 | 141728.4888 | 0.09948596 | 0.03522700 |
| 1976 | 2137702.9066 | 367720.6908 | 263132.5232 | 101713.9418 | 161418.5813 | 0.10502969 | 0.04060741 |
| 1977 | 2201547.1716 | 364474.5723 | 284884.2225 | 113520.1542 | 171364.0683 | 0.16196784 | 0.05034054 |
| 1978 | 2228580.2679 | 350444.8448 | 242712.6726 | 102219.3075 | 140493.3651 | 0.23638405 | 0.07385727 |
| 1979 | 2217645.7054 | 310428.2734 | 251939.2858 | 108860.9744 | 143078.3114 | 0.35285060 | 0.12971066 |
| 1980 | 2156010.0572 | 257108.0804 | 240295.2988 | 99156.6671 | 141138.6317 | 0.51956047 | 0.24596408 |
| 1981 | 2259718.0053 | 225083.1700 | 257389.8621 | 106363.5298 | 151026.3323 | 0.28705731 | 0.35503303 |
| 1982 | 2329495.6438 | 235565.1847 | 243541.4781 | 114467.8816 | 129073.5966 | 0.31373966 | 0.45554321 |
| 1983 | 2427645.0972 | 244914.5132 | 246234.0717 | 122804.7200 | 123429.3517 | 0.31737156 | 0.57393101 |
| 1984 | 2600178.3136 | 265701.9812 | 235441.8406 | 117355.8278 | 118086.0128 | 0.49010990 | 0.85254691 |
| 1985 | 2712037.9443 | 290443.5496 | 290141.0120 | 147499.2893 | 142641.7227 | 0.43810479 | 1.30345958 |
| 1986 | 2895376.6440 | 345065.4482 | 311954.1743 | 168142.7115 | 143811.4628 | 0.41780217 | 1.76781005 |
| 1987 | 3179532.6287 | 419978.0493 | 301562.1677 | 171492.2373 | 130069.9304 | 0.44515888 | 2.35944703 |
| 1988 | 3225677.1061 | 475386.7888 | 248890.0594 | 141024.0371 | 107866.0223 | 0.58253635 | 4.00458879 |
| 1989 | 3278196.2975 | 486783.2224 | 260434.9183 | 156359.1797 | 104075.7385 | 0.54692437 | 7.02733809 |
| 1990 | 3585234.8427 | 570093.4171 | 280732.2393 | 157641.1048 | 123091.1345 | 0.39981586 | 11.07814592 |
| 1991 | 3597752.9220 | 572637.1270 | 284717.8262 | 152499.2253 | 132218.6009 | 0.51129650 | 17.63302969 |
| 1992 | 3828122.2432 | 605503.1157 | 301868.5204 | 154051.8822 | 147816.6382 | 0.52425024 | 28.82888369 |
| 1993 | 4139808.3770 | 799565.9336 | 326104.4635 | 176447.2353 | 149657.2282 | 0.53599636 | 48.24674032 |
| 1994 | 3887902.9165 | 760269.5350 | 192052.4850 | 95944.1008 | 96108.3842 | 0.84239792 | 100.00000000 |
| 1995 | 4197095.3423 | 847456.7988 | 190320.7839 | 81879.1410 | 108441.6429 | 0.56314523 | 187.15055357 |
| 1996 | 4495968.7062 | 923851.9279 | 244827.6066 | 115832.5896 | 128995.0170 | 0.65812319 | 333.14437842 |
| 1997 | 4868683.1556 | 1020064.8002 | 318459.3179 | 148961.1944 | 169498.1235 | 0.64312544 | 603.72098698 |
| 1998 | 5056396.6304 | 963920.2015 | 333625.2442 | 168783.0785 | 164842.1657 | 0.59971023 | 1058.42828228 |
| 1999 | 4748739.7974 | 791948.8488 | 327582.7400 | 164882.7272 | 162700.0128 | 0.63675140 | 1648.49981972 |

Data Definitions and Sources

Y (**real**) is the real GNP in 1994 prices (billion TL). *Sources*: Nominal GNP series are obtained from SPO (1997: Table 1.1) and SPO (2001: Table II.3) for 1963-1996 and 1997-1999, respectively.

P is the real GNP Deflator (1994=100). *Sources*: SPO (1997: Table 1.1) and SPO (2001: Tables II.3 and II.4) for 1963-1996 and 1997-1999, respectively.

Ip (real) is the real private fixed investments in 1994 prices (billion TL). Nominal private fixed investment series are deflated by private fixed investment deflator series. *Sources*: Nominal private fixed investment series are obtained from SPO (1997: Table 2.4) and SPO (2001: Table IV.1) for 1963-1996 and 1997-1999, respectively. Deflators are provided by the SPO.

Ig (real) is the real public fixed investments in 1994 prices (billion TL). Nominal public fixed investment series are deflated by public fixed investment deflator series. *Sources*: Nominal public fixed investment series are obtained from SPO (1997: Table 2.4) and SPO (2001: Table IV.1) for 1963-1996 and 1997-1999, respectively. Deflators are provided by the SPO.

Igi (real) is the real public fixed core infrastructural investments in 1994 prices (billion TL). Nominal sectoral public fixed investment series are deflated by relevant sectoral public fixed investment deflator series. In line with Ekinci (1990) among others core infrastructural investment is defined as the total of the public energy, transportation and communication sectors' fixed investments. See World Bank (1994: 2) for broad definition of infrastructure. [Note that non-core infrastructural investment is defined as the total of the all sectors' fixed investments *except* public energy, transportation and communication sectors. Thus, **Igni (real)**, which denotes the real public fixed non-core infrastructural

investments in 1994 prices (billion TL), is calculated in similar way.] *Sources*: Nominal sectoral public fixed investment series are obtained from SPO (1997: Table 2.7) and SPO (2001: Table IV.1) for 1963-1996 and 1997-1999, respectively. Deflators are provided by the SPO.

Macroeconomic instability index (MII) is calculated by using human development index (HDI) methodology (UNDP, 1992) and it is based on four macroeconomic instability indicators; namely, inflation rate, public deficit to GNP ratio, external debt to GNP ratio and change in exchange rate (exchange rate variability), identified by previous researchers (See Chapter 6). Note that the four indicators are not in the same units and more importantly they have different ranges, i.e. they have different minimums and maximums. Therefore, it seems not sensible to sum their values or to take their simple average in order to obtain a composite index. Fortunately, the HDI methodology circumvents these problems. MII is, therefore, constructed in two steps utilizing this methodology. In the first step, four sub-indices are constructed based on the general formula: $I_t = (X_t - X_t)$ $X_{Min})$ / $(X_{Max}$ - $X_{Min})\!,$ where I_t refers to the index value of variable X, i.e. macroeconomic instability indicator X, in year t, Xt refers to the actual value of indicator X in year t, and X_{Min} (X_{Max}) refers to the minimum (maximum) value of indicator X over the whole period under consideration (1963-99). Note that in line with their construction, all sub-indices have common ranges, i.e. they are bounded between 0 and 1. In the second and the final step, MII is constructed by taking simple average of the four sub-indices obtained as above. Thus, MII is also bounded between 0 and 1.

Note: (1) Inflation rate refers to the %-age change in GNP Deflator; (2) the change in exchange rate is proxied by the %-age change in (year-average) US\$ rate; (3) public deficit refers to the consolidated budget deficit; and (4) external debt refers to medium and long term outstanding external public debt. *Sources*: (1) Data sources for the GNP Deflator are given above. (2) Exchange rate (US\$ rate) data for 1963-1996 and 1997-1999, are obtained from SPO (1997: Table 3.14), and SPO (2001: Table V.25), respectively. (3) Consolidated budget deficit to GNP

ratio data for 1963-1996 and 1997-1999, are obtained from SPO (1997: Tables 5.5 and 5.6), and SPO (2001:Table VI.2), respectively. While deficit is recorded as (+), surplus is recorded as (-). Note that realized deficit (cash balance) figures are used for the 1963-74 (1975-99) period (see SPO, 1997: Tables 5.5 and 5.6). There is also difference in the revenue and the expenditure figures between the 1963-74 and 1975-99 periods due to accounting practice. That is, foreign and domestic borrowing (repayment) are included in the revenues (expenditures) in 1963-74 period. (4) Data for medium and long term outstanding external public debt are obtained from SIS (1994: Tables XVIII-10 and 11) and SPO (2001: Table V.24) for 1964-1992 and 1993-1999, respectively. Medium and long term outstanding external public debt figure for 1963 is not available but it is estimated backward by using the growth rate of the total foreign debt from 1963 to 1964. The total foreign debt data for 1963 and 1964 are obtained from SPO (1997: Table 3.12). It should be also noted that during the late 1990s the Treasury revised the foreign debt figures (see SPO, 2001: Table V.24). For the sake of consistency, figures for 1997-1999 period are obtained by extending the old series (1963-96) with the growth rates obtained from the new series.

APPENDIX L

TURKISH SUMMARY

Türkiye ve birçok kalkınmakta olan ülke (örneğin bazı Latin Amerika ülkeleri) uzun süreler boyunca popülist ve kısa görüşlü (miyopik) politikalar izlediler. Bu tür politikaların neticesinde, kronik makroekonomik istikrarsızlık (yüksek ve oynak enflasyon oranı; artan bütçe açıkları ve borç yükü; v.s.) ve bununla bağlantılı olarak hayal kırıklığı yaratan ekonomik performans (düşük ve oynak sermaye oluşumu ve büyüme oranları; tekrar eden krizler; v.s.) bu ülkelerin temel makroekonomik sorunları olmuştur.

Günümüzde birçok iktisatçı sosyo-politik faktörlerin (örneğin gelir dağılımındaki adaletsizlik) kamu harcama ve borçlanma politikaları üzerinde önemli etkileri olduğunu vurgulamaktadır. Bazı iktisatçılar daha da ileri giderek, makroekonomik istikrarsızlığa sebep olan popülist ve miyopik politikaların temelinde sosyo-politik dengesizliklerin olduğunu söylemektedirler.

Bu doktora tezi iki kısımdan oluşmaktadır. Tezin birinci kısmında politik makroiktisat modelleri oluşturularak, bir takım politik iktisat (ve kurumsal) faktörlerin maliye politikaları ve makroekonomik performans üzerindeki rolü incelenmektedir. Tezin ikinci kısmında, Türkiye ekonomisindeki makroekonomik istikrarsızlığın sermaye birikimi ve ekonomik büyüme üzerindeki etkileri 1963-1999 yılları için araştırılmaktadır.

BİRİNCİ KISIM: SİYASET, KAMU HARCAMALARI, BORÇLANMA VE MAKROEKONOMİK PERFORMANS

Tezin bu kısmında maliye politikalarının oluşturulması ile ilgili bazı politik makro-iktisat konularının daha iyi anlaşılması için teorik bir çerçeve oluşturulmaktadır. Bu konular siyasi istikrarsızlığın kamu harcama ve borçlanma kararları ve makroekonomik performans üzerindeki rolü; mali daralmaların bileşimi; rüşvetin kamu yatırımlarının kalitesi ve makroekonomik performans üzerindeki rolü; ve sermaye borçlanma kuralının (*capital borrowing rule*) makroekonomik performans üzerindeki etkilerini içermektedir. Bu kısımda oluşturulan modellerin en temel özelliği verimli (*productive*) ve verimsiz (*non-productive*) kamu harcamaları arasında bir ayırımın yapılmasıdır. Verimi artıran ve dolayısıyla üretim seviyesinde artış yaratan bir kamu harcaması (örneğin kamu altyapı yatırımları) verimli harcama olarak, tersi durumunda ise (örneğin genel idare harcamaları) verimsiz harcama olarak sınıflandırılmaktadır. Bu modellerin diğer bir temel özelliği ise hükümetin ya da politika yapıcıların bazı kamu harcama türlerini diğer türlere tercih etmesinin bir takım politik iktisat faktörler tarafından belirlenmesidir.

Bu kısımdaki sonuçları şu şekilde özetleyebiliriz. Farklı tür kamu harcamalarının gelecekteki makroekonomik performans üzerinde asimetrik etkileri olduğu gösterilmiştir. Verimli kamu harcamalarındaki bir artış bir sonraki dönemde üretim seviyesi ve enflasyon oranı üzerinde olumlu etki yaratırken, popüler (veya verimsiz) kamu harcamalarındaki bir artış bir sonraki dönemde aynı makroekonomik değişkenler üzerinde olumsuz bir etki yaratmaktadır. İlginç olan sonuç ise verimli kamu harcamalarının olumlu etkilerinin sadece üretim ve enflasyon ile kısıtlı olmaması ve gelecekteki popüler harcamaları da kapsamasıdır. Bu nedenle, popüler harcamaları verimli harcamaları azaltmak pahasına artırmak gelecekteki üretim ve enflasyon açısından değil aynı zamanda gelecekteki popüler harcamalar açısından da kötü olabileceği gösterilmiştir.

Bu kısım, yukarıdaki sonuçlarla bağlantılı olarak, miyopik (myopic) ve popülist (populist) politikalara ve bunların makroekonomik performans üzerindeki olumsuz etkilerine politik iktisat açıklamaları getirmeye çalışmaktadır. Diğer bir devişle, bu kısımda sosyo-politik istikrarsızlığın ekonomik politikaların oluşturulmasındaki ve makroekonomik istikrarsızlık üzerindeki rolü incelenmiştir. Örneğin yüksek düzeydeki siyasi istikrarsızlığın (seçim belirsizliği vasıtasıyla), kamu yatırımlarının düşük seviyede gerçekleşmesine yol açarak, stratejik davranışa ve miyopik politikalara yol açabileceği gösterilmiştir. Yine benzeri şekilde, yüksek düzeydeki siyasi istikrarsızlığın aşırı (ve stratejik) borç birikimi yaratarak miyopik politikalara yol açabileceği gösterilmiştir. Burada üzerinde durulması gereken husus, hem borçlanma hem de kamu yatırımlarının bir zaman unsuruna bağlı olmalarıdır. Başka bir deyişle, mevcut hükümetin borçlanma ve kamu yatırımları ile ilgili kararları gelecekteki (fakat bugün itibariyle seçimlerden dolayı belirsiz olan) hükümetlerin kaynak ve harcamalarını etkileyerek gelecekteki ekonomik politikaları etkileyebilme özelliğine sahiptir. Ayrıca mevcut hükümetin gelecek dönem için seçilme olasılığının düşük olması bu hükümeti miyopik politikalar izlemeye teşvik etmektedir. Daha açık bir ifadeyle anlatmak gerekirse, mevcut hükümetin gelecek dönem için seçilme olasılığının düşmesi (örneğin politik istikrarsızlığın artmasından dolayı) bu hükümetin popüler harcamaları verimli harcamaları azaltmak pahasına artırmasına ve bu harcamaları finanse etmek için aşırı borçlanmaya yönelmesine neden olabilmekte ve gelecekte daha kötü bir makroekonomik performansa ve hatta istikrarsızlığa yol açabilmektedir. Bu sonuçlar ilgili literatürdeki sonuçlar ile örtüşmektedir.

Aynı şekilde, gelir dağılımı adaletsizliğinin, sosyal ve etnik bölünmüşlüğün çok yüksek düzeyde olduğu ülkelerde, ve bu sosyo-politik özellikler sonucunda siyasi istikrarsızlığında yüksek düzeyde olduğu bu ülkelerin hükümetleri kamu yatırım harcamaları gibi verimliliği artırıcı harcamaları azaltma pahasına hükümetin seçmenlerin gözünde popülerliğini artıran harcamaları artırması (örneğin kamu çalışanlarına yapılan ek maaş artışları ve sosyal harcamalardaki artışlar) daha olası olduğu birçok iktisatçı tarafından bilinmektedir. Birinci kısımda oluşturulan teorik çerçevede, hükümetlerin bu tür popülist davranışlarının, daha yüksek enflasyon oranına ve üretim ve kamu harcamalarının azalmasına yol açtığı gösterilmiştir. Başka bir deyişle, bu tür politikalar bir sonraki dönemde daha kötü bir makroekonomik performansa yol açmaktadır. Bu sonuçlar mevcut literatürdeki sonuçlar ile örtüşmektedir ancak birinci kısımda oluşturulan teorik çerçevenin diğer çalışmalardan ayırt edici özelliği hem verimli kamu harcamalarının verimliliği artırıcı rolünün dikkate alınması hem de bu kurguda makroekonomik performans ile hükümetin kamu harcamaları ile ilgili kararlarının ilişkilendirilmesidir.

Birinci kısımdaki teorik çerçeve bize aynı zamanda iki tür kamu harcamasının makroekonomik performans üzerindeki etkilerini hem merkezi (mali ve para otoritelerinin tek bir merkezi otoriteye ya da devlete bağlı olduğu durumda) hem de merkezi olmayan kurumsal yapı (para otoritesinin, yani Merkez Bankasının, bağımsız olduğu durumda) çerçevesinde de incelemeye fırsat tanımaktadır. Bu kısımdaki temel sonuçlar (örneğin iki tür kamu harcamasının asimetrik etkileri) her iki kurumsal yapıda da nitel olarak da aynıdır. Ancak, ilginç olan sonuç, Merkez Bankasının bağımsız olduğu durumda, özellikle gelişmekte olan ülkelerdeki verimli kamu harcamalarının gelecekteki makroekonomik performans üzerindeki olumlu (ve göreceli olarak yüksek olması beklenen) etkisi göz önünde bulundurulduğunda, merkezi yapıya kıyasla daha iyi bir makroekonomik daha düşük enflasyon sonucu performans (örneğin bir oranına) alınamayabileceğidir.

Keynesyen veya geleneksel görüş mali daralmanın ekonomi üzerinde daraltıcı etkisi olduğunu vurgulamaktadır. Ancak, son yıllardaki araştırmalar, özellikle Danimarka ve İrlanda'nın deneyimlerini inceleyenler, bazı tür mali daralmaların genişletici, yani Keynesyen olmayan (*Non-Keynesian*) etkileri ile ilgili ampirik bulgular sunmaktadır. Bu çalışmalardan genişletici mali daralmalar diye adlandırılan yeni bir literatür oluşmuştur. Bu literatürün ana mesajı mali daralmaların yapısının da önemli olduğudur. Örneğin hükümetin cari veya sosyal transfer harcamaları yerine kamu yatırım harcamalarını azaltması durumunda

daraltıcı bir etkinin gerçekleştiği, fakat bunun tersi olursa mali konsolidasyonların genişletici etkiye sahip olduğu vurgulanmaktadır.

Genişletici mali daralmalar konusundaki mevcut çalışmalar bu tür mali daralmaların Keynesyen olmayan etkileri konusunda bazı kanallar önermişlerdir. Örneğin kamu tüketimindeki bir azalma olumlu servet etkisi ve bekleyiş etkisi yaratarak özel tüketimi artırabilmektedir. Buna karşılık, bu tezin birinci kısmında, verimli kamu harcamalarının verimliliği artırıcı rolü dikkate alınarak, Keynesyen olmayan mali daralmalar için alternatif bir kanal önerilmektedir. Bu kısımda oluşturulan kurguda, mevcut hükümetin siyasi olarak riskli olan seçeneği uygulaması, yani kamu yatırımlarından ziyade popüler kamu harcamalarını düşürmesi durumunda, Keynesyen olmayan sonuçlar elde edilmektedir. Ancak, mevcut hükümet siyasi olarak daha az riskli seçeneği seçerse, başka bir deyişle hükümetin popüler harcamalar yerine verimli harcamaları azaltması halinde Keynesyen etkilere ulaşılmaktadır.

Birinci kısımda incelenen başka bir konu ise maliye politikalarının nitel unsurlarının makroekonomik performans üzerindeki etkisi ve rolüdür. Özellikle, son zamanlarda rüşvetin veya iltimasın kamu yatırımlarının kalitesi ve üretim düzeyi üzerindeki olumsuz etkileri ile ilgili olarak elde edilen ampirik ilişkileri anlamak için basit bir kurgu oluşturulmuştur. Bu çerçevede kamu yatırımlarının kalitesinin de kamu yatırımlarının olumlu etkilerini pozitif yönde etkilediği gösterilmiştir. Başka bir deyişle, rüşvet ve iltimasçılığın kamu yatırımlarının kalitesini (verimliliğini) olumsuz yönde etkileyerek kamu yatırımlarının makroekonomik performans üzerindeki olumlu etkisini azaltmaktadır.

Bazı yazarlar stratejik borç birikimini (*strategic debt accumulation*) önlemek için hükümetlerin belli kurallara bağlı olarak borçlanmalarını (yani bağlayıcı borç kuralları uygulanmasını) ön plana çıkarmışlardır. Örneğin denk bütçe kuralı özel bir durumdur. Ancak, bu tür kuralların bazı sakıncaları vardır. En önemli sakınca, bağlayıcı borç kurallarının kamu yatırımlarının azalmasına yol açabileceğidir. Örneğin Avrupa Parasal Birliği'ne üye birçok ülkenin İstikrar ve Büyüme Paktı tarafından empoze edilen kamu açıkları ile ilgili mali kurallara (denk bütçe kuralına yakın) uymaya çalışırken kamu yatırımlarını kıstığı geniş bir kitle tarafından vurgulanmaktadır. Aynı şekilde, Avrupa Parasal Birliği'nin oluşturulmasından sonra Avrupa'daki ekonomik büyümedeki yavaşlama birçok yazarın ilgisini bu tür kurallara çekmiştir.

Bunların yanı sıra, bazı yazarlar sadece kamu yatırımlarının finansmanı için hükümete borçlanma olanağı tanıyan sermaye borçlanma kuralının stratejik (politik) davranışları engelleyebileceğini savunmaktadırlar. Aynı şekilde, böyle bir kuralın mali disiplin açısından da önemli olduğu sık sık tartışılmaktadır. Sonuç olarak, bu kural sıkça kamu finansmanının "altın kuralı" olarak da adlandırılmakta ve birçok ABD eyaleti ve Hollanda belediyeleri tarafından uygulanmıştır. Benzeri "altın kural" 1997'den beri Yeni İşçi partisinin kamu yatırımlarındaki düşüş eğilimini tersine çevirme sözü ile iktidara geldiği Birleşik Krallık'ta da uygulanmaktadır.

Kamu borçlanmalarının ve sermaye boçlanma kuralının kamu yatırımı ve makroekonomik performans üzerindeki rolünün anlaşılması kalkınmakta olan ülkeler açısından da aşağıda bahsedeceğimiz nedenlerden dolayı çok büyük bir önem teşkil etmektedir. Öncelikle belirtmek gerekir ki, siyasi istikrarsızlık (ve kutuplaşma) birçok gelişmekte olan ülkenin kamu borçlanma ve harcama kararları üzerinde önemli bir etkiye sahiptir. Buna ilaveten, kamu yatırımlarının verimliliğinin bu ülkelerde yüksek olması beklenmektedir; böylece, verimsiz (popüler) harcamaların kamu yatırımlarını azaltma pahasına tercih edildiği politikalar bu ülkeler açısından daha kötü bir etki yaratmaktadır. Son olarak, bu ülkelerde iç borçlanmanın makroekonomik performans üzerinde, finansal piyasaların az gelişmiş ya da sığ olmaları ile bağlantılı olarak, ciddi etkileri vardır. Bu nedenlerden dolayı, birinci kısımda son konu olarak kamu borçlanmasının ve sermaye borçlanma kuralının kamu harcama politikaları, özellikle kamu yarırımları, ve makroekonomik performans üzerindeki etkileri incelenmektir.

Bu bağlamda, mevcut teorik çerçeve kamu borçlanma kararları dahil edilerek genişletilmiştir ve borçlanma ile finanse edilen verimli harcamaların, örneğin kamu altyapı yatırımlarının, bir sonraki dönemdeki makroekonomik performans üzerindeki net etkisinin olumlu veya olumsuz olabileceği gösterilmiştir. Başka bir devişle, borçlanma ile finanse edilen verimli harcamaların gelecek dönemdeki makroekonomik performans üzerindeki net etkileri bu harcamaların olumlu etkilerinin yanı sıra borçlanmanın maliyetinede bağlıdır. Burada üç durum söz konusudur. Örneğin verimli kamu harcamalarının bir sonraki dönemdeki olumlu etkisinin boçlanma maliyetini aşması durumunda verimli kamu harcamalarının bir sonraki dönemdeki makroekonomik performans üzerindeki net etkisi pozitifdir. Bunun tersi durumunda ise, yani bir sonraki dönemdeki olumlu etkinin boçlanma maliyetini aşmaması durumunda, verimli kamu harcamalarının bir sonraki dönemdeki makroekonomik performans üzerindeki net etkisi negatifdir. Son olarak, eğer olumlu etki boçlanma maliyetine eşitse, o zaman bir önceki dönemde yapılan verimli kamu harcamalarının makroekonomik performans üzerinde hiçbir etkisi yoktur. Diğer bir deyişle, böyle bir durumda verimli kamu harcamalarının net etkisi sıfırdır.

Aynı kurgu kullanılarak sermaye borçlanma kuralının kamu harcama kararları ve makroekonomik performans üzerine etkileri de incelenmiştir. Sermaye borçlanma kuralının uygulanması durumunda bile kamu yatırımlarındaki bir artışın makroekonomik performans üzerinde olumsuz etkilerin olabileceği ve bu kuralın uygulanması her ne kadar stratejik amaçlı borçlanmayı engellese de, kamu yatırımlarının stratejik amaçlı kullanımını engellemeyebileceği teorik olarak gösterilmiştir.

İKİNCİ KISIM: MAKROEKONOMIK İSTIKRARSIZLIK, SERMAYE BİRİKİMİ VE EKONOMİK BÜYÜME: TÜRKİYE DENEYİMİ, 1963-1999

Günümüzde birçok iktisatçı makroekonomik istikrarsızlığın sermaye birikimi ve ekonomik büyüme üzerinde olumsuz etki yarattığı görüşünü paylaşmaktadırlar.

Makroekonomik istikrarsızlık hem özel sektör hem de kamu sektörü sabit sermaye yatırımlarını, farklı kanallardan (ve farklı büyüklükte), negatif yönde etkilelemektedir. Örneğin istikrarsızlık seviyesindeki bir artış belirsizliği artırarak özel sektör yatırımlarını azaltmaktadır. Diğer yandan, istikrarsızlık seviyesindeki bir artış hükümetin gelir ve harcamaları üzerinde olumsuz etki yaparak (Olivera-Tanzi etkisi, emisyon kazançlarının azalması, faiz yükü etkisi, v.s.) kamu yatırımlarını azaltmaktadır.

Makroekonomik istikrarsızlığın özel ve kamu yatırımları üzerindeki farklı etkileri neticesinde, kronik istikrarsızlık uzun vadede özel ve kamu yatırımları arasındaki ilişkinin şeklini (örneğin tamamlayıcılık ilişkisini) etkileyebilir. Makroekonomik istikrarsızlığın özel ve kamu yatırımları ve bunların arasındaki ilişki üzerine etkileri mevcut literatürde incelenmemiştir. Bu nedenle, bu tezin ikinci kısmı Türkiye ekonomisinin makroekonomik istikrarsızlığının özel sektör yatırımları, kamu sektörü yatırımları ve ekonomik büyüme üzerine etkilerinin yanı sıra özel sektör ve kamu sektörü yatırımları arasındaki ilişkinin yapısı üzerine etkisini 1963-1999 yılları için incelemeyi amaçlamaktadır.

Bu bağlamda, ilk önce Türkiye ekonomisinin 1963-1999 yılları arasındaki genel durumu, makroekonomik istikrarsızlık süreçleri, sermaye birikimi ve ekonomik büyüme dinamikleri dikkate alınarak incelenmiştir. Bu incelemenin kısa bir özeti aşağıda sunulmuştur.

Kronik istikrarsızlık, popülist süreçler, tekrar eden krizler ve bunların neticesinde gerçekleşen düşük ve oynak sermaye birikimi ve ekonomik büyüme oranları Türkiye'nin yakın tarihindeki önemli makroekonomik konularının başında gelmektedir.

Genel olarak değerlendirilecek olursa, Türkiye ekonomisinin 1960'lı yıllardaki makroekonomik ortamı istikrarlı olmuştur. Ancak, 1970'li yılların ortasından itibaren makroekonomik istikrarsızlık sürekli olarak artmış ve Türk ekonomisi için kronik bir problem olmuştur. Bunun yanı sıra Türkiye ekonomisi 1963-1999

döneminde iki tane şiddetli ekonomik kriz (1978-79'da ve 1994'te) yaşamıştır. 1960'lı yıllarda Türkiye'nin, makroekonomik istikrarsızlığın temel göstergesi olarak kabul edilen yıllık enflasyon oranı kalkınmakta olan ülkelerle aynı düzeydeydi. Ancak, 1970'li yılların ortasından itibaren Türk halkı yüksek ve oynak enflasyon oranları ile yaşamaya başlamıştır. 1970'li yılların sonlarından itibaren, seçilmiş birçok hükümet uzun süreler boyunca dengesiz ekonomik politikalar (örneğin miyopik ve popülist makroekonomik politikalar) izledi. Bu politikalar neticesinde oluşan mali dengesizlikleri ve yüksek enflasyon oranlarını şiddetli ekonomik krizler takip etmiştir. Bazı hükümetler, özellikle krizlerden sonra, ekonomide yeniden istikrar ortamını sağlamak için çeşitli istikrar programlarını uygulamaya koydu ancak, genelde siyasi nedenlerden dolayı, bu hükümetler ekonomide geçici bir rahatlama gördükten sonra genelde ya bu istikrar politikalarını ertelediler ya da tamamen uygulamaktan vazgeçtiler. Buna ilaveten, bu hükümetler ve halefleri genelde popüler ve miyopik makroekonomik politikaları, özellikle gelir dağılımı ile ilgili politik baskıları azaltmak ve neticede oy oranlarını korumak veya artırmak amacıyla, sürdürdüler. Ve bu tür sağlıksız politikaları uzun süreler boyunca sürdürmenin bedeli artan ve yüksek seviyeli bütçe açıkları, aşırı borç birikimi, ve yüksek ve oynak enflasyon oranları olmuştur. Başka bir deyişle, Türkiye ekonomisi kronik ve yüksek düzeyde makroekonomik istikrarsızlık yaşamıştır. Ve netice itibarıyla, Türkiye ekonomisi tekrar eden şiddetli ekonomik krizlere karşı savunmasız kalmış ve bu krizler sonucunda ciddi (ve acı) mali ve ekonomik daralmalar yaşanmıştır.

Her ne kadar 1970'li yılların sonunda yaşanan ve 1980'li yılların sonlarında ve 1990'lı yıllarda yaşanan makroekonomik istikrarsızlık süreçleri farklı ekonomik ve kurumsal yapı (makroekonomik politika oluşturma açısından) altında gerçekleşmişse de, mali ve siyasi istikrarsızlıklar makroekonomik istikrarsızlık süreçlerinin temel unsurları olmuştur.

Kronik makroekonomik istikrarsızlık ve tekrarlanan krizlerin hem Türkiye ekonomisi ve hem de Türk politikası açısından yüksek maliyeti olmuştur. Bunun ötesinde, popülist harcamaların artışı ve son zamanlardaki aşırı faiz ödemeleri

(aşırı iç borçlanmadan kaynaklanan) ile ilişkilendirilen yakın zamanda (1980'li yılların sonlarında ve 1990'lı yıllarda) yaşanan makroekonomik istikrarsızlık süreci neticesinde kamu yatırım harcamaları, diğer harcamalara kıyasla, çok orantısız ve daha kötü bir şekilde etkilenmiştir.

Türkiye ekonomisinin 1963-1999 yılları arasındaki genel durumu incelendikten sonra, tezin ikinci kısmının son bölümünde, modern zaman serisi teknikleri kullanılarak makroekonomik istikrarsızlık, özel sektör yatırımları, kamu sektörü yatırımları ve GSMH arasındaki ampirik ilişkiler incelenmektedir.

Bu bağlamda, yukarıda bahsedilen dört makroekonomik değişken arasındaki uzun vadeli ilişki Johansen eşbütünleşme tekniği çerçevesinde incelenmiştir. Aynı zamanda kısa ve orta vade ya da dinamik etkileri incelemek için genelleştirilmiş dürtüye tepki fonskiyonları (*generalized impulse response functions*) kullanılmıştır. Ayrıca daha önce yapılan çalışmalara da uyarak, ampirik analiz aynı zamanda sadece kamu altyapı (enerji+ulaştırma+iletişim sektörleri) yatırımları dikkate alınarak da genişletilmiştir. Bu nedenle, iki farklı değişken uzayı oluşturulmuştur. Bütün veriler reel ve logaritmik formdadır. Ve tüm veriler DPT ve DİE'den elde edilmiştir.

Bu kısımda ayrıca makroekonomik istikrarsızlık seviyesini ölçmek için makroekonomik istikrarsızlık endeksi (*macroeconomic instability index*), enflasyon oranı, bütçe açığı-GSMH oranı, dış borç-GSMH oranı ve döviz kuru değişimi gibi önemli makroekonomik istikrarsızlık göstergeleri kullanılarak oluşturulmuştur.

Ampirik bulgular, kronikleşmiş ve artan makroekonomik istikrarsızlığın, sermaye oluşumu ve ekonomik büyümeyi kötü yönde etkilediğini göstermiştir. Özel sektör yatırımlarının yanı sıra kamu yatırımları da (özellikle altyapı yatırımları) kronikleşmiş ve artan makroekonomik istikrarsızlıktan olumsuz yönde etkilenmiştir.

Bunlara ilaveten, istatistiksel olarak çok anlamlı olmasa da, uzun dönemde toplam kamu yatırımlarının özel yatırımlar üzerinde dışlama (*crowding-out*) etkisi olduğu saptanmıştır. Fakat genelleştirilmiş dürtüye tepki fonskiyonlarından çıkan sonuç kısa ve orta vadede kamu sektörünün hem toplam hem de altyapı yatırımlarının özel sektör yatırımları ile tamamlayıcı (*complementary*) olma özelliklerinin olduğudur. Bu sonuca göre, Türkiye deneyimi makroekonomik istikrarsızlığın sadece ekonomik büyümeyi engellemekle kalmayıp uzun vadede özel sektör ve kamu sektörü yatırımları arasıdanki tamamlayıcılık ilişkisini de bozduğunu (hatta tersine çevirdiğini) göstermektedir. Bu bulgular, Türkiye ekonomisindeki özel sektör ve kamu sektörü yatırımları arasındaki tamamlayıcılık ilişkisi ile ilgili ampirik bulgulardaki çelişkiye de biraz ışık tutmaktadır.

Ayrıca, ampirik bulgular şu anda makroekonomik istikrarsızlığı gidermek için yürütülen istikrar programını desteklemektedir. Ancak, bu çalışmanın sonuçları, politika yapıcılarını mali disiplini (sıkı maliye politikası) sağlarken kamu harcamalarının bileşimi konusunda çok dikkatli olmaları gerektiğini vurgulamaktadır.

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