The Dynamics of Size, Composition, and Fiscal Authority in Government Expenditures: Examining The Effects of Social Disturbance

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Abstract

This dissertation investigates changes in size, composition, and fiscal authority of government expenditure brought on by social disturbance by examining the effects of German reunification on government spending. This research tests several hypotheses using data on total spending and six major sub-policy spending categories between 1972 and 2006.

First, this study identifies strong evidence of a large upward displacement effect following reunification, with a particular emphasis on social security spending. Second, this study finds a strong and positive correlation between per capita GDP and total spending as well as social security, education, and public safety spending, which confirms Wagner's Law. Results also reveal that unemployment rate is strongly and positively related to total spending and several sub policy categories both before and after reunification.

Additionally, this study finds that the proportions of the youth and elderly populations are negatively associated with total spending after reunification. However, the proportion of the youth population is positively associated with per capita education spending, as the proportion of elderly population with social security spending.

The results also show that economic openness has a strong positive impact on both total spending and economic services spending; however, the relationship between economic openness and social security, education, and health spending after reunification is negative. The right party control variable has no significant impact on total spending after reunification, though party control

does seem to influence social security and defense spending. Furthermore, the election variable does not have a significant impact on spending except for a positive and significant impact on social security spending after reunification.

On the other hand, the coalition government and the proportion of public employees variables have strong and positive impacts on total spending and several sub-policy categories after reunification. The deficit ratio variable is found to have a positive and significant impact on total spending and public safety spending after reunification.

Lastly, using a traditional expenditure ratio and a composite ratio to measure fiscal decentralization, this study finds that after reunification there is a trend towards fiscal centralization in total spending and social security, economic services, health, and public safety spending.

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Chapter 1

Introduction

This dissertation investigates the dynamics of Germany's government spending that have occurred as a result of reunification. It compares the impact of major determinants on the total governmental budget and on spending in several functional areas both before and after reunification. It builds on previous studies of changes in government expenditure following wars and business depressions, and extends that analysis more comprehensively to the context of reunification, which may cause long-lasting multi-dimensional changes in resource allocation and public spending with theoretical and policy implications. Through this process, it attempts to find valuable implications as to effects of social disturbance on government expenditure change.

The dynamics of government expenditure change are mainly characterized by changes in three elements: size, defined as the total amount of money spent; composition, the way in which money is allocated to different fiscal priorities; and fiscal authority, the distribution of budgetary authority between federal and local governments. Most previous research on government expenditure examines changes in a single element or its impact on economic growth and the welfare state. Some studies focusing on large-scale events determine that those elements of government expenditure might change in the context of wars and business depressions (Peacock and Wiseman 1961; Legrenzi 2004).

A substantial body of research indicates that most developed countries experienced remarkable governmental growth in the periods following World Wars I and II (Henrekson 1994; Goff 1998). These studies suggest that once a new level of expenditure is set, often spurred by crisis-response periods of rapid change, spending rarely returns to previous levels (Higgs 1987;

Porter 1994). Similarly, previous studies have suggested that wars and business depressions often alter the composition of government expenditures by imposing new and expanded obligations in specific policy areas (Legrenzi 2004). For example, during the oil crises of the 1970s, Japan increased spending on social security programs such as pensions and unemployment benefits relative to spending on other government programs (Nomura 1995). Moreover, some studies have looked specifically at postwar expansion of federal governments, arguing that the crisis effects of wars increase demand for rapid and effective intervention by federal governments in the form of increased spending and the mobilization of resources for large-scale relief efforts (Rockman 1987; Rockoff 1999; Broadberry and Harrison. 2005).

These studies have focused mainly on wars and business depressions that caused sudden and unpredictable changes in the economic and political spheres (Tussing and Henning 1991). In addition, they have generally tested elements in isolation from one another, rather than analyzing the changes from an integrated perspective. For example, some studies have examined only changes in the amount of total expenditure (Higgs 1987; Henrekson 1993; Legrenzi 2004), while others have probed the relationship between World Wars I and II and the growth of the federal government (Rockoff 1999; Higgs 1987, 2006).

In this context, reunification is worth examining as a significant abrupt large-scale event from an empirical perspective because the merging of two regimes gave rise to multi-dimensional changes resulting from the integration of different political, economic, and social systems and from the necessity of equalizing living conditions between regions with different levels of economic development. Reunification also led to the rapid expansion of public spending and increased demand for strong governmental intervention in many sectors of the economy. Moreover, from a theoretical perspective, it is both necessary and productive to conduct a more comprehensive

examination of the changes in size, composition, and fiscal authority of government expenditure that may take place concurrently and noticeably during periods of such events. In particular, it is valuable to assess how influence of determinants on government expenditure may change prior to and following such large-scale events.

Therefore, this study aims to make a more comprehensive examination of changes in German government expenditure as a result of reunification and to identify the fiscal implications of social disturbance. The specific objectives of this dissertation include:

1. To examine the main determinants of changes in German government expenditure both as a whole and in some specific functional budget categories, and to identify some of the similarities and differences among specific sub-policy areas.
2. To evaluate the different influence of determinants on government expenditure change prior to (1972-1990) and following (1991-2006) reunification.
3. To investigate whether a significant increase or "displacement effect" in German government spending occurred after reunification.
4. To determine whether change in fiscal decentralization occurred after reunification, and if so, to identify the categories or sub-policy areas that experienced the greatest change.

1.1. Definition and Characteristics of Social Disturbance

Abrupt, large-scale events such as World Wars I, World War II, and the oil crises of the 1970s have been described by scholars of public finance as "social disturbances." The concept of social disturbance was first introduced by Peacock and Wiseman (1961) to explain the rapid government growth in the United Kingdom following World War II. Since then, a handful of researchers have examined social disturbance in terms of government revenue and expenditure

shifts following major events, such as oil crises (Nomura 1995; Kozumi and Hasegawa 2000) and World Wars I and II (Goff 1998; Legrenzi 2004). Other scholars have referred to social disturbance as social upheaval, external shock, or structural breaks (Diamond 1977; Tussing and Henning 1991) in relation to public finance. Despite these efforts, academic research has yet to present a clear definition and explanation of social disturbance. Social disturbance may be loosely defined as a large-scale event which breaks down an established social structure within a short period of time. Such disturbances are unpredictable and rupture social order, necessitating immediate and wide-ranging governmental intervention.

One characteristic of social disturbance is that it occurs unexpectedly, with little indication as to how long it will last. For example, despite some speculation about the sub-prime mortgage and housing price bubble bursting, the current financial crisis was largely unexpected. Moreover, the duration of this crisis and what its outcome will be are still in question. The Great Depression was triggered by a sudden and unexpected stock market crash on "Black Tuesday" in 1929. At that time, no one could have predicted that the economic devastation would spread so quickly or persist for so long.

Another distinctive feature of social disturbance is that it brings unforeseen and immeasurable distress to society. Social disturbance breaks down established systems and produces unpredictable and uncontrollable consequences (Farazmand 2007). As the current financial crisis unfolded, the market economy could no longer function effectively, resulting in the collapse of a great number of banks, investment institutions, and insurance companies. Many people lost their jobs and homes, and the overall economy nearly collapsed.

Given these characteristics, social disturbance necessitates immediate and decisive governmental intervention and expansion. This is because only the government has the capacity to

address such widespread crises, mobilize resources, and bring stability to society during a social disturbance (Farazmand 2007). When the United States entered World War II, its constitutional structure was immediately altered to restrict judicial power and expand executive autonomy, streamlining administrative mobilization of economic resources (Higgs 1987). Also, the government's immediate and unprecedented reaction to the current financial crisis, which includes bailing out the troubled private sector and becoming a major stakeholder in large financial institutions, has prevented deeper economic disorder.

The extent of governmental intervention varies depending on the magnitude of the social disturbance. In the wake of the collapse of the Soviet Union and the transition to democracies, the governments of many Eastern European countries were compelled to intervene in almost all sectors in order to respond to fundamental social changes. On the other hand, the US government focused primarily on defense spending following the outbreak of both World Wars and spending on social and economic programs following the oil crises of the 1970s.

This expansion of government's role usually brings about an enlargement of a government's budget and administrative structure. Social disturbances also force governments to change their priorities within functional areas. As a government becomes more deeply involved in social welfare during periods of economic crisis, its defense priorities are weakened. Moreover, social disturbance may allow the federal government to take precedence over state and local governments on the basis of its superior institutional and fiscal power.

In light of the features that characterize social disturbances, a distinction must be made between them and gradual structural changes. The "graying" of society, or the increase in the elderly population, and gradual climate change are examples of phenomena that happen slowly, are predictable, and do not require immediate governmental intervention. The moderate pace of these

processes allows governments time to analyze their potential impact on society and to formulate appropriate policy responses. Therefore, the time scale of governmental intervention in response to such phenomena is much longer than that required in response to social disturbance.

These characteristics and examples of social disturbances are summarized in Table 1-1.

Table 1.1. Characteristics and Examples of Social Disturbances

<Characteristics of Social Disturbance>
• Occurs Unexpectedly • Brings Unforeseen and Immeasurable Distress to Society • Necessitates Immediate and Decisive Governmental Intervention and Expansion
<Examples of Social Disturbances>
• Economic and Business Crisis (The Great Depression, Oil Crises, Financial Crisis) • National Security and Safety Emergency (World War I and II, The September 11 Terrorist Attack, Hurricane Katrina) • Political and Economic Revolution (Reunification, Structural Transition of Eastern European Countries)

1.2. Explanations of Government Expenditure Changes

Since the pioneering studies by Borcherding and Deacon (1972) and Bergstrom and Goodman (1973), substantial research literature has developed theories that examine the socio-economic, political, and institutional determinants contributing to government expenditure change.

From a socio-economic perspective, one of the most popular models of government expenditure growth, Wagner's Law, posits that increases in government spending result from an increased need for public facilities and the maintenance of law and order as well as from income-elastic demand in areas such as education and transportation. These conditions follow the income growth and increased population density that accompany industrialization. Other models point to changes in the age composition of the population, such as growth in the numbers of school-age children and the elderly, as a cause of increased government expenditure. The counter-cyclical policy

explanation links public spending growth to government responses to macroeconomic variables, such as recession and unemployment. Moreover, some studies propose that greater economic openness may also enhance the role of the public sector as a social insurer against external risks from greater competition.

From a political perspective, the party control theory holds that governments under the influence of progressive parties expand the role of the public sector through increased taxes and expenditures (Cameron 1978; Blais and Blake 1993). The coalition government theory claims that the greater the number of parties that participate in the government's decision making processes, the more government spending increases (Alesina and Drazen 1991). Similarly, intensified political competition is believed to make parties propose more government spending as a means to gain leverage in elections.

From an institutional perspective, the bureaucracy explanation suggests that expansion of government expenditure can be driven by self-interested government employees who desire increased government spending for their own well-being (Garand 1988). In the fiscal illusion hypothesis, it is believed that government growth can be attributed to less-visible revenue systems, such as indirect taxes and debt financing, which cause citizens to underestimate the cost of public goods and services and hence demand more government spending (Buchanan and Wagner 1977).

Some research argues that periods of time after social disturbances like World Wars I and II and the oil crises of the 1970s are characterized by dramatic increases in public spending, demonstrating the "displacement effect" developed by Peacock and Wiseman (1961). This theory suggests that in the aftermath of large-scale shocks, taxpayers accept higher levels of taxes and public spending than they would have tolerated in non-crisis times because the taxes are seen as necessary to recover from these shocks (Henrekson 1993). Furthermore, even after this period is

over and the country is in a state of partial or full recovery, public spending levels may remain high or may fall slightly, but will never return to the level that existed prior to the disturbance.

Most previous research has focused on examining either total spending or various spending components in isolation (Shelton 2007). Some studies have tested a combination of hypotheses on total expenditure of one nation or across nations (Lowery and Berry 1983; Lewis-Beck and Rice 1985; Rice 1986; Garand 1988; Kapeluck 2001). Others have separately examined specific theories on social welfare spending (Kaufman and Segura-Ubiergo 2001; Hicks and Zorn 2005; Sanz and Velazquez 2007), education spending (Grob and Wolter 2005; Busemeyer 2007), or defense spending (Al-Yousif 2002; Hassan et al. 2003; Ali 2007). Although many of these studies have identified typical variables—such as income, population, age structure, unemployment rate, and institutional factors—as determinants of both total spending and major functional spending, few studies have tested those determinants simultaneously in both contexts.

In addition, most research to date has examined general patterns of budgetary change as long-term trends rather than looking at the effects of specific large-scale events or social disturbances. While several social disturbances may have altered causal patterns among multiple variables in complex ways, effecting both the total amount and the composition of public spending, a wide range of studies covering the World Wars and oil crises (Lewis-Beck and Rice 1985; Rice 1986; Rockoff 1999) have treated each social disturbance as a single determinant and captured its simple effect by using a dummy variable. Moreover, a majority of studies on social disturbances have been focused on determining the existence of the displacement effect.

In contrast to these conventional approaches, it is worthwhile to analyze both the determinants of aggregate spending and major components of the public budget in conjunction in order to better understand the overall dynamics of government expenditure changes. This

comprehensive approach better reflects the actual considerations taken into account when deciding fiscal policy. Fiscal policy makers do not set budgets—total or functional—by considering their components in isolation, but rather arrive at their decisions by considering how certain determinants are linked to both the total budget and to budget categories, as well as what share of the total should be allocated to each expenditure category. Furthermore, considering that social disturbances, such as economic crises and natural disasters, have occurred more frequently in recent years, there is a growing need for more in-depth studies that focus specifically on identifying patterns of public budget change prior to and following social disturbances.

Additionally, since the 1970s, the transfer of functions and authorities previously vested in federal government to lower levels of government has emerged as a significant trend. Accordingly, a growing body of literature seeks to explain the extent of fiscal decentralization and its impact on government size, economic growth, and the expansion of the welfare state (Oates 1972). Conversely, some studies have argued that fiscal centralization is an inevitable and continuous process and is effective in improving the provision of public services (Diaz-Cayeros 2005), while providing no clear empirical support.

Previous research, however, has not paid much attention to the effects of social disturbances on changes in fiscal authority. As noted earlier, social disturbances often generate pressures to shift fiscal allocation power to higher levels of government, changing the degree of fiscal decentralization. Consequently, looking at the change in fiscal decentralization and the sub-policy areas where it occurs as a result of social disturbances will help expand the scope of research on fiscal authority changes.

1.3. Reunification and the Dynamics of German Government Expenditure

As noted above, there is value in studying the dynamic changes in government expenditure that coincide with national reunification. Among a handful of cases, that of Germany offers a particularly promising subject. Compared to Yemen, which underwent civil war after reunification, and Vietnam, which remained a communist state after reunification, Germany has shown noticeable changes in its government expenditure amid the political and economic progress made since its peaceful reunification.

Several factors specific to the conditions associated with reunification contribute to government expenditure growth. First, high levels of government spending are needed to balance the contrasting socio-economic conditions of the two regions, such as disparities in income levels, life-styles, status, power, and security. In a reunification scenario, once the weaker regime disintegrates, the majority of government spending is funneled into the reconstruction of the underdeveloped economic system. These efforts include the provision of public goods and huge financial transfers.

During the German reunification process, annual per capita expenditure increased rapidly from an average of 5,471 Euro between 1972 and 1990 to 10,742 Euro between 1991 and 2006. In particular, the enormous public transfers from the West to the East amounted to a total of 1.6 trillion USD cumulatively from 1991 to 2004, or approximately 4-5 percent of West Germany's GDP. As a result, government debt increased markedly: the debt-to-GDP ratio rose from 42 percent in 1990 to 67.7 percent in 2006.

Second, the integration of disparate political and economic systems may require intense government spending on public goods and social welfare, which may be further enlarged by internal migration. This process will be compounded by the dysfunction of the labor market, with a high

rate of unemployment in the underdeveloped region for a certain period of time. At the same time as social welfare spending is increasing, the reduction of tensions between the two regions and the integration of defense systems can create cost savings in defense spending, thus shifting the composition of overall public expenditures.

In Germany's case, changes in the composition of government spending as a result of reunification are clearly evident. Pronounced political and economic differences between East and West Germany spurred heavy government spending on public goods and social welfare, with emphasis on addressing the socio-economic conditions of the underdeveloped East. For instance, social security spending surged from 48.8 percent of total government spending between1972 and 1990 to 54.1 percent between 1991 and 2006. Meanwhile, reduced tensions between East and West and the integration of German defense systems under a single regime allowed for the elimination of unnecessary defense competition and lowered overall defense spending. Defense spending decreased from 15.6 percent of total spending between 1972 and 1990 to 5.7 percent between 1991 and 2006.

Third, budget spending discretion and authority may be shifted to the federal government from state and local governments. This occurs because the political situation will be dominated by the powerful principle of establishing uniform living conditions across the newly unified state, the urgency of overcoming social turmoil, and the need to effectively finance necessary resources. As a result of reunification, Germany's public sector experienced an increase in fiscal centralization. The percentage of all government expenditures undertaken by the federal government increased from an average of 55.8 percent from 1972-1990 to nearly 58 percent from 1991-2006.

1.4. Contribution and Importance of the Research

This dissertation builds on existing literature about government expenditure change, but

seeks to make several distinctive contributions.

First, this study demonstrates that the dynamics of government expenditure can be better understood by analyzing both total spending and the functional components of the public budget. By testing the leading theories both in the pre- and post-reunification periods, it also shows how reunification can influence the effects of factors that determine government expenditure.

Second, this is the first study to establish that the displacement effect occurs as a result of reunification. This study paves the way for further research on whether the displacement effect may occur as a result of other social disturbances to which previous studies—conducted in context of wars, oil crises and business depressions—have not given sufficient attention.

Third, this study reveals how social disturbance may affect change in fiscal authority for a certain period of time. This finding implies that the number and scale of social disturbances may influence differences in the degree of fiscal decentralization among countries.

Fourth, the findings of this study may also provide valuable implications for public finance scholars and budget decision makers. Social disturbance may allow government's greater authority to intervene in markets and change the composition of government expenditures. These changes may also make reducing the size and the numbers of public organizations and officials a difficult task, contributing to the continuation of government growth.

1.5. Organization of the Research

This dissertation consists of six chapters, including this introductory chapter. Chapter II, "Literature Review on Government Expenditure Change," presents a review of existing theories and frameworks explaining changes in government expenditure. These theories will be presented under the three main categories of socio-economic, political, and institutional explanations. This chapter

also includes studies on the existence of the displacement effect on government expenditure growth and literature on the causes of fiscal federalization.

Chapter III, "Data and Methods," presents the data set, the empirical model, and the major determinants or indicators to be tested. In particular, this dissertation will employ the Driscoll/Kraay method for pooled times-series cross-sectional data on German government expenditures between 1972 and 2006.

Chapter IV, "Empirical Findings of Changes in German Government Expenditure," explains what factors affected changes in total expenditure and functional budget categories prior to and after the reunification. Moreover, it establishes the existence and extent of the displacement effect and fiscal authority change.

Chapter V, "Theoretical Discussions and Implications," presents discussions of the empirical findings. This chapter analyzes how theories of government expenditure change are confirmed in total expenditure and major functional budget categories. In addition, it compares the influence of determinants on government expenditure changes prior to and after the reunification.

Chapter VI, "Conclusion," makes a summary of the empirical results in the previous chapters and provides suggestions for future research.

Chapter 2

Literature Review on Government Expenditure Change

Previous research on government expenditure change is concerned largely with explaining patterns of the expansion of public size and budgetary structures, and with determining the effects of the level and composition of government expenditures on the economy and welfare state. The primary focus, however, seems to have been on accounting for the determinants or factors that fuel government expenditure growth and structural changes.

Numerous explanations have been proposed and tested empirically, both in the United States (Lowery and Berry 1983; Lewis-Beck and Rice 1985; Garand 1988; Kapeluck 2001; Besley and Case 2003; Ansolabehere and Snyder 2006) and in many other countries (Cameron 1978; Mann 1980; Lamartina and Zaghini 2008; Ziramba 2008).

Since Lowery and Berry (1983) divides competing theories of expenditure growth into demand-side or responsive theories and supply-side or excessive theories, many researchers have adopted this approach in their analyses. Considering the government to be a neutral agent that simply responds to the demands of the people, demand-side theories explain the size and composition of government expenditure as a function of changing popular demand (Garrett and Rhine 2006). In contrast, supply-side theories suggest that government is not simply an instrument of society but plays an important role in shaping public policy and expenditures according to its own interests.

Although separating demand-side and supply-side theories is a compelling and valuable approach, there is no clear distinction between the two types of theories. Some explanations of expenditure growth can be classified under both demand- and supply-side theories (Buracom 2007).

Therefore, this study will organize numerous theories of expenditure growth into socio-economic, political, and institutional categories. First, socio-economic explanations are based on the idea that economic indicators and the characteristics of a society – such as population size, education, status, and ethnicity – determine the degree of governmental growth. This category includes Wagner's Law, the age composition model, counter-cyclical policy theory, and openness of economy explanation. Second, political explanations posit that the ideas and strategies of particular parties or groups in political or electoral competition influence government expenditure growth. The party control theory, the political business cycle theory, and the coalition government model fall into this category. Third, institutional explanations claim that the institutional framework within which decisions on government expenditure are made plays an important role in determining governmental growth. The bureau voting explanation and the fiscal illusion theory are popular models within this category.

Along with these explanations of determinants, the displacement effect theory – which illuminates the mechanism of government expenditure change occurring as a result of social disturbance – will be presented as a large scale event-centered approach. The final section of this literature review will discuss the theoretical foundations of fiscal authority change.

2.1. Theories of Size and Composition in Government Expenditure

2.1.1. Explanations Emphasizing Socio-Economic Determinants

Wagner's Law

Wagner's Law is one of the most widely tested theories in modern history regarding growth of government size and expenditure. In his seminal study, Wagner (1893) postulates that "as progressive nations industrialize, the share of the public sector in the national economy grows

continually."

Wagner's Law suggests that industrialization causes three main socio-economic changes that are the underlying reasons for increases in the size of the public sector: per capita income growth, urbanization, and demand for social investment.

First, industrialization increases per capita income and subsequently leads to expansion of the public sector because public expenditure is elastic and responsive to changes in per capita income. As individual incomes increase, the general standard of living rises, and the demand for education and social welfare programs becomes stronger.

Second, as the population becomes larger and more densely settled in urban areas, demand for government-provided goods and services increases (Lowery and Berry 1983; Cox and Utt 2004; Holcombe and Williams 2008). The higher population density leads to the expansion of governmental activities necessary to support large numbers of people living closely together, such as providing water and sewer services, police forces, and fire protection.

Third, government expenditure grows in response to growing demand for social investment. For instance, to satisfy the population's increasing need for technologies such as mass transportation systems and electric utility grids, the government is required to make massive investments in infrastructure that cannot be financed by the private sector alone (Mann 1980).

In short, Wagner's Law may be interpreted as mandating an increased share for the public sector in the total economy, implying a tendency for government activities to expand along with economic development (Henrekson 1993; Akitoby et al. 2006; Lamartina and Zaghini 2008; Kalam and Aziz 2009).

Empirical tests of this law yield results that vary depending on the unit of measure employed. Income growth, the most frequently tested indicator, shows positive effects on the size of

the public sector. In their analysis of public expenditure in the United States from 1948 to 1979, Lowery and Berry (1983) found that increased per capita income brings about increases in government spending. Many other studies have also found a similar relationship between income growth and government spending in the United States (Lewis-Beck and Rice 1985; Ram 1987; Islam 2001; Chang 2002). Moreover, Thornton (1999) found evidence supporting Wagner's Law in six European countries.[1] However, the literature highlights a number of exceptions. Cameron (1978) found no evidence that income growth has a positive influence on government size in his analysis of 18 industrialized countries. Garand (1988) and Ferris and West (1995) also found no evidence to support Wagner's Law in the United States. Narayan et al. (2007) tested Wagner's law using panels of Chinese provinces and claimed that there are only few provinces in support of the theory. Durevall and Henrekson (2010) analyzed data from the early 19th century to the present day in Sweden and the United Kingdom and found the Wagner's Law does not hold in the long run in both countries.

Income growth is also considered to have a significant influence on sub-policy expenditure. Many studies have found that income has a positive effect on social security spending (Courakis et al. 1993; Visco 2001; Than Dang et al. 2001). In addition, a strong and positive correlation between national income and expenditure on health care is also discovered (Gerdtham and Jonsson 1991; Hitiris and Posnett 1992; Karatzas 2000). Spending on education is also found to be affected positively by income (Falch and Rattso 1997; Fernandez and Rogerson 1997; Marlow and Shiers 1999; Baqir 2002). Empirical findings indicate that higher income contributes to higher levels of governmental spending on transportation and communications (Randolph et al. 1996; Canning and Pedroni 1999; Fay 2000).

[1] Wagner's law can be confirmed in other studies of Taiwan (Sun 1997), Japan (Nomura 1995), Canada (Ahsan et al. 1996; Biswal et al. 1999), Britain (Oxley 1994), Greek (Sideris 2007), East Asian countries (Kumar 2009), New Zealand (Kumar et al. 2009) and other countries (Akitoby et al. 2006; Lamartina and Zaghini 2008).

On the other hand, the relationship between income growth and defense spending cannot be generalized across countries (Hartley and Sandler 1990). [2]

Population density seems to show inconsistent results in supporting Wagner's Law. Kau and Rubin (1981) fail to find evidence of positive relationship between population density and government expenditure. More recently, Burchell and Mukherji (2003), Cox and Utt (2004), and Litman (2004) found that population density has a negative effect on spending by local governments in the United States.

In addition, some scholars (Randolph et al. 1996; Fay 2000) argue that low population density may require greater expenditure to reach a given level of infrastructure service, although certain kinds of infrastructure expenditure (such as the costs associated with providing sewage systems and water treatment facilities) are of limited importance when population density is low. Moreover, countries with a higher proportion of their populations in urban areas are expected to spend less on infrastructure per capita when economies of scale in infrastructure provision dominate (Heller and Diamond 1990). Meanwhile, Arimah's research (2005) on cities in developing countries implies that the greater financial resources of large cities made them better able to meet the infrastructure needs of their residents than small and medium-sized cities. In short, population size and population density may exert both positive and negative pressure on the level of government expenditure, depending on the size and degree of economies (or diseconomies) of scale. Economies of scale may develop from more efficient use of public facilities, while diseconomies of scale may be due to congestion or high communication costs (Holcombe and Williams 2008).

[2] Empirical studies showed positive results (Hartley and Sandler 1990; Hewitt 1991; Collier and Hoeffler 2002; Goldsmith 2003). However, Fritz-Assmus and Zimmerman (1990), Looney (1997) and Gupta (2001) found that income growth had negative effects on defense expenditures.

Age Composition

In addition to increases in the size and density of a population, changes in the age structure of a population can also be considered as a determinant of increasing demand for public goods, especially in the case of policies related to the young and the elderly. There is strong empirical evidence to support the general claim that age composition is a positive factor in growth of public expenditure. Garand and Kapeluck (2000) analyze U.S. state budgets between 1961 and1997 and conclude that states with larger numbers of school-age children and people over the age of 65 experienced public expenditure increase. Many other scholars get similar results in their analyses of spending data from U.S. states government (Garand 1993; Kapeluck 2001; Painter and Bae 2001), the U.S. federal government (Berry and Lowery 1984; Lewis-Beck and Rice 1985), and governments in multiple countries (Karavitis 1987; Swank 1988).

Examining the implications of age composition in detail, as some scholars suggest, an increase in the number of school-age children would be expected to be associated with higher demands for youth-related public goods, such as education and child care. In particular, younger generations are likely to influence state and local finances because elementary and secondary education comprises the largest portion of spending at both levels of government (Painter and Bae 2001). Ahlin and Johansson (2001) also point out that a rise in the proportion of young people will cause parents to press for increases in public spending on education.[3]

The elderly are also expected to have a significant influence on government growth (Kapeluck 2001). Under this hypothesis, an increase in the proportion of elderly people in the

[3] On the other hand, Fletcher and Kenny (2008) develop a model in which the elderly, who typically have little demand for local educational services, vote in support of lower educational spending. Other empirical studies produced mixed results of a relationship between age composition and educational spending (Falch and Ratsso 1999; Painter and Bae 2001; Brunner and Balson 2004).

population will create more demand for spending on health and welfare programs such as medical care and pensions (Rice 1986; Martins 2006). Thus, although Gerdtham and Jönsson (1991) and Zweifel et al. (1999) did not find aging of the general population to have any significant effect on health-related government expenditures, many other scholars have argued that health and welfare spending increases along with the share of population over the age of 64 (Weinblatt and Luski 1998; Hitiris 1999; Visco 2001; Than Dang et al. 2001; Galasso and Profeta 2004; Shang and Goldman 2007).

Counter-Cyclical Policy

Counter-cyclical policy theory argues that public expenditure should act as a stabilizing force and move in a counter-cyclical direction; that is, governments may respond to recession and unemployment by increasing expenditure. The rationale behind this theory is that large-scale government expenditure can increase aggregate demand and thereby stimulate economic growth and employment.

In this respect, the group that is often most successful in securing government funds is comprised of individuals disadvantaged by unhealthy economic conditions. For instance, the unemployed regularly pressure governments for immediate relief from their plight (Rice 1986). To relieve unemployment, governments implement various social welfare policies, such as creating jobs or supplying unemployment benefits. Moreover, governments often react to sour economies by implementing costly emergency programs designed to stimulate economic growth (Lewis-Beck and Rice 1985). Therefore, a lot of studies (Painter and Bae 2001; Kapeluck 2001; Potrafke 2008) included the unemployment rate as determinant of public expenditure.

Many studies have consistently supported the positive effect of the unemployment rate on

government spending (Cameron 1978; Lewis-Beck and Rice 1985; Garand 1993; Buracom 2007). Using data from 20 member nations of the Organization for Economic Cooperation and Development (OECD) between 1984 and 1993, Abrams (1999) shows that government expenditures rose with unemployment rates. Analyses of European Union countries by Christopoulos and Tsionas (2001) produce similar results.

The Openness of Economy

The argument that globalization drives governmental growth is based on the hypothesis that governmental spending increases in response to demand for social protection programs to mitigate the effect of globalization on society. Considering governments to be required to compensate those disadvantaged by globalization, the *Compensation Hypothesis* proposes a positive relationship between globalization and government expenditure growth (Garrett 2001). In his seminal study, David Cameron (1978) demonstrated a connection between trade openness and government expenditure, postulating that through collective bargaining, people in industries that are dying or defeated by global competition put forth a greater demand for social protection. In such situations, government-funded unemployment benefits, for example, would increase to alleviate material inequality between winners and losers amid the integration of the global economy (Garrett 1998). Moreover, when frequently exposed to external risks – such as supply and demand fluctuation, volatile capital mobility, or unstable exchange rates – people ask their governments to take a greater role in ensuring economic security (Rodrik 1998; Garrett 1998; Garrett and Mitchell 2001; Kaufman and Segura-Ubiergo 2001; Erauskin-Iurrita 2008; Epifani and Gancia 2009).

On the other hand, the *Efficiency Hypothesis* posits that globalization heightens industrial competition, constrains government policy intervention, and exerts a negative influence on public

expenditure (Garrett 2001).[4] As globalization advances, high tariffs, subsidies, and other protective government policies are expected to be reduced because they distort domestic markets and reduce the efficiency of the economy. Consequently, income transfer and social service programs will no longer be provided generously to workers, thus reducing government expenditure on social welfare (Huber et al. 1997). In addition, free capital mobility is expected to bring pressure on the government to become more efficient and market-friendly in order to attract investment in the global arena (Garrett 1998; Garrett and Mitchell 2001). As a result, governments' ability to protect their markets via policy intervention fades away.

Thus, empirical results of whether or not globalization leads to increased government spending depend on which effect dominates: compensation or efficiency. In general, the two processes counteract each other and bring about different results depending on a country's specific economic circumstances. The results of empirical tests as to which effect outweighs the other have been mixed.

Supporters of the compensation hypothesis argue that the economic vulnerabilities created by trade openness – specifically, the risk of job losses – can be expected to generate demand for sub-policy spending (particularly in the area of social protection) and thereby fuel an expansion of welfare spending (Hicks and Swank 1992; Huber et al.1997; Balle and Vaidya 2002; Wibbels 2006; Erauskin-Iurrita 2008; Epifani and Gancia 2009).

Moreover, many studies focusing on the OECD countries, which might well be better equipped to respond to globalization than the rest of the world, show that trade openness has a positive effect on total government expenditure (Huber et al.1997; Bernauer and Achini 2000; Gemmel et al. 2008) and on social welfare spending (Hicks and Swank 1992; Bretschger and Hettich

[4] For details, especially on the summaries of empirical results on *Compensation and Efficiency hypotheses*, see (Gemmell et al. 2008).

2002). In an analysis of 48 U.S. states, Balle and Vaidya (2002) also identify the positive effect of trade openness on state social welfare spending.

Nevertheless, some empirical studies support the efficiency hypothesis and present evidence that economic openness encourages austerity in governmental intervention and the reduction of spending on social programs. For instance, many studies show that globalization helps decrease social security spending in OECD countries (Garrett and Mitchell 2001; Kittel and Winner 2005) and developing countries (Kaufman and Segura-Ubiergo 2001; Rudra 2002). Similarly, Alesina and Wacziarg (1998) examine the effects of trade liberalization in 137 developed and developing countries and found evidence in support of the efficiency hypothesis. However, Dreher (2006) conclude that globalization does not influence total government expenditure or social welfare spending. Likewise, Brady (2005) examines the effects of trade openness on the social spending in 17 OECD countries and shows a mixed result.

The effect of market openness on other sub-policy spending areas is also explored. Market openness is shown to have a positive effect on health spending, because job losses cause workers to demand more public health care (Kaufman and Segura-Ubiergo 2001). Avelino et al. (2005) found a positive relationship between trade openness and education spending in Latin American countries. In addition, Alesina and Wacziarg (1998) and Figlio and Blonigen (2000) also found that economic openness has a positive effect on educational expenditure at both the national and local levels.

2.1.2. Explanations Emphasizing Political Determinants

Party Control

Party control theory claims that characteristics of political parties affect the size and structure of public spending because parties play a vital role in shaping public policies and

distributing public goods and services across different regions and groups. Progressive (or ideologically left-wing) parties are assumed to represent lower-income groups that favor an active role for government in market intervention and income redistribution; hence, progressive control of the executive and legislative branches of government is expected to result in an increase in government spending.

Conversely, conservative (or ideologically right-wing) parties are assumed to be supported by higher-income groups that aim to minimize the role of the state in shaping market operations and outcomes (Cusack 1997). Thus, governments controlled by conservatives will tend to decrease government spending, or to minimize increases in government expenditure.

Given the long history of distinctive differences in ideologies and major policies between the two major political parties in the United States, the effect of partisan politics on U.S. government spending has been analyzed extensively. Examining U.S. government spending from 1948 to 1984, Berry and Lowery (1984) found evidence of a pattern of spending increases when the federal government is controlled by the Democratic Party. A considerable body of literature has showed evidence in support of the party control theory in studies focused on the United States (Budge and Hofferbert 1990; Ansolabehere and Snyder 2006).

Most multiple-country studies have revealed similar effects on the size of the public sector. Examining 15 liberal democratic countries, Blais and Blake (1993) indicated that greater control by left-wing parties led to larger government size. De Haan and Sturm (1994) also showed consistent results in their analyses of European countries. However, Brauninger (2005) examines the 19 OECD countries from 1971 to 1999 and found that, although the actual spending preferences of parties do affect government size, differences between the spending behavior of left-wing and right-wing parties could not be consistently characterized.

For major sub-policy spending categories, progressive party leadership of government has been found to generate higher welfare spending than conservative party leadership (Hicks and Swank 1992; Cusack 1997). A number of studies claims that welfare spending increases under progressive party leadership in Western Europe (Korpi 1989), as well as in developing countries (Moller et al. 2003).

Moreover, following the rationale that progressive parties have their electoral base in the lower income classes, research has indicated that those parties are inclined to establish more extensive public education systems than their conservative counterparts (Boix 1997). In contrast, Oberndorfer and Steiner (2006) argue that governments under conservative parties spend more on public education than governments run by the progressive party alone.

In addition, it is also expected that public health expenditures will tend to increase under progressive governments (Potrafke 2007). As for defense spending, Correa and Kim (1992) show a positive relationship between party control and defense spending, but other researcher fail to find significant evidence of this effect (Rundquist and Carsey 2002).

However, given the vague ideological positioning of modern political parties, their ability to significantly influence the development of major spending policies and to control issues related to expenditure has been called into question. Critics maintain that increasing socio-economic demands for public goods and services – such as better social welfare or economic stabilization – diminish policy differences between parties on the left and those on the right. Also, when it comes to elections, parties tend to move toward a centrist ideological position in order capture electoral majorities (Downs 1957). Kwon and Pontusson (2005) examined the OCED countries from 1962 to 2000 and found that partisan influences on social spending declined during the 1990s. Potrafke (2008) also point out that from 1990 to 2005, the impacts of political factors on the budget

composition in OECD countries became weaker.

Political Business Cycle

The political business cycle model posits that incumbent politicians increase government expenditure during election periods in order to gain electoral advantage (Nordhaus 1975). Assuming politicians to be vote-maximizers, Nordhaus (1975) claims that opportunistic incumbents manipulate expansionary monetary and fiscal policies by increasing spending, thus improving economic performance and satisfying larger numbers of voters. Accordingly, government expenditure tends to increase during election periods as politicians try to satisfy the electorate by implementing polices designed to benefit them.

Rogoff and Sibert (1988) also develop the political business cycle model based on temporary asymmetric information before and after elections. In their model, voters have rational expectations about government policies, but are unsure of politicians' fiscal competency to deliver government goods and services with less revenue. Therefore, politicians have an incentive to increase government expenditure in pre-election periods in an effort to signal their competence, because the consequences of post-election deficits are not observed prior to the elections.

Many early empirical studies focused on industrialized countries at the national level. For instance, several scholars found evidence in support of the political business cycle model in the United States (Alesina 1987; Rogoff and Sibert 1988). More recently, Grier (2008) analyzed the relationship between presidential elections and government growth in the United States during the period of 1961 to 2004 and confirmed the effect of political business cycles. Other studies showed similar results in analyses of OECD countries as well (Alesina et al. 1992). Moreover, other studies (Khemani 2004; Brender and Drazen 2005; Vergne 2009) also confirmed the existence of politically

driven budget cycles in developing countries.

Evidence for the existence of political business cycles has also been found in Canada (Blais and Nadeau 1992), Israel (Rosenberg 1992), Germany (Berger and Woitek 1997; Seitz 2000), and the United States (Besley and Case 2003). Furthermore, there is also evidence of political business cycles at the municipal level of government (Veiga and Veiga 2006).

However, after testing this theory based on data from OECD countries between 1990 and 2005, Potrafke (2008) argued that the electoral effects on public expenditure are insignificant.

Coalition Government

In the coalition government explanation, the main cause of government spending growth is the larger number of parties in government (Bawn and Rosenbluth 2006). The rationale is that parties aim to maximize their share of seats by making budgetary decisions in favor of their own constituents' welfare.

As a single-party government, an incumbent party can choose its policy itself according to the demand of its constituencies. However, coalition government is a different story: each member of a coalition is assumed to have its preference over specific issues which are crucial to its constituencies. Moreover, as the responsibility for enacting the budget is shared by a larger number of political parties, the costs or risks (in political terms) of passing an over-sized budget decrease. Therefore, the more the party in a coalition, the bigger the budget becomes.[5]

Similar to the argument of coalition government, the divided government has been mainly discussed in existing literature. The divided government explanation claims that when the ruling party is the minority in congress, expenditure programs in favor of the opposition party would be

[5] Please see (Ashworth et al. 2005; 397), for the argument of coalition government and budget deficit.

included into the budget through political compromise to avoid the gridlock, leading to government expenditure growth (Kapeluck 2001). The divided government mostly appears in Presidential system, when the executive and legislative branch is controlled by different parties. Coalition government exists in a parliamentary system, where cabinet of government is composed of several parties' cooperation.

On the other hand, there are two competing theoretical perspectives on the consequences of coalition government, represented by the *Veto Player Hypothesis*.[6] Veto points or players are believed to make legislation less efficient or more difficult. According to the first view, government expenditure is likely to increase when the number of veto players increases, because veto-threatening agents may make their consent dependent on inclusion of some programs for them or their constituencies (Alt and Lowry 1994). According to the second view, the divergence in the veto players' preferences make changes in public expenditure policies more difficult because the presence of coalitions implies the presence of more veto players, with the result that the status quo tends to be maintained (Tsebelis 1999).

A considerable number of studies have supported the hypothesis that coalition governance tends to increase budgets or raise budget deficits. Persson and Tabellini (2000) found that public spending is higher under parliamentary systems where coalition governments occur more frequently. Likewise, Bawn and Rosenbluth (2006) showed a positive correlation between the numbers of parties in government and increased public spending in 17 Western European countries from 1970 to 1998. Moreover, analyzing the fiscal behavior of 13 OECD countries over the period of 1960 to 1985, Roubini and Sachs (1989) found that multi-party coalition governments face higher budget

[6] Tsebelis (1999; 2004) argues that having many veto players makes significant policy changes difficult or impossible, resulting in higher high deficits.

deficits. Many scholars have also found evidence to support this conclusion in studies of OECD countries and of other developing countries (Volkerink and de Haan 2001; Schaltegger and Feld 2004; Hagen and Vabo 2005). However, studies of European countries, which generally have political systems in which coalition government occur frequently, have failed to show any significant positive effect on government growth (Balassone and Giordano 2001; Freitag and Sciarini 2001; Tsebelis 2004).

2.1.3. Explanations Emphasizing Institutional Determinants

Bureau Voting

The bureau voting model attributes the expansion of government expenditures to the self-interested behavior of government bureaucrats. Niskanen (1971) argues that bureaucrats tend to maximize the size of their agencies' budgets in accordance with their own interests - such as salary, prestige, or power - because they have monopoly power over the public and the legislature as to have their own influencing budgetary way in decision making. The ability of public sector employees to produce excessive growth in government expenditures is facilitated by the fact that they constitute a sizable share of the electorate. Therefore, increase in the number of bureaucrats is expected to result in greater governmental spending, independent of citizens' demand for public goods (Garrett and Rhine 2006). Three linked hypotheses build on this model: 1) Bureaucrats have policies that support incentives to expand the size of government; 2) Bureaucrats are more likely to vote than other citizens, 3) Consequently, the bureaucracy is assumed to vote for candidates advocate who increasing the budget (Niskanen 1971).

Although the bureau voting theory has been substantiated by empirical research, it has been criticized on the grounds that bureaucrats prefer discretionary funds to large budgets (Migue and

Belanger 1974), that they are motivated by the possibility of promotion when budgets are reduced, and that their ability to increase maximize budgets is limited by the efforts of politicians in the executive branch of government.

Many empirical tests of the bureau voting model have shown a fairly positive relationship between the number of government employees and the amount of government expenditure, though a few studies have found evidence of a negative relationship (Berry and Lowery 1984; Lowery and Berry 1983).

In an analysis of fifty U.S. States, Garand (1988) found that the proportion of state government workers in the labor force has a significant and positive effect on public sector growth. Painter and Bae (2001), and Ferris and West (1995) also produced similar findings. Likewise, Kapeluck's (2001) analysis of U.S. data from 1946 to 1997 found a strong positive impact on state level, though the effect was not significant at the federal level.

Research on the impact of bureau voting on individual sub-policy spending is scarce. However, as Niskanen has revised his theory in later works, he has come to place greater emphasis on the idea that bureaucrats seek to maximize their discretionary budgets. Garand and Kapeluck (2000) argued that federal employees are significantly more supportive of increased spending for guaranteed student loans and education.

Fiscal Illusion

According to the theory of fiscal illusion, governmental growth is a function of taxpayers' erroneous perceptions of tax burdens leading them to exert "excess" demands for public expenditure. In general, three factors are suggested to produce illusionary effects: the visibility of

the tax system, deficit finance, and the complexity of the revenue system.[7] At first, Oates (1988) postulates that while direct taxes on personal income or property are highly visible, indirect taxes imposed in the course of market transactions (i.e. sales and corporate taxes) are difficult to apprehend (Pommerehne and Schneider 1978). Thus, as government increases the proportion of total tax revenues derived from indirect taxes, public awareness of their real tax burden diminishes. In addition, people find it easy to ignore withholding provisions because they never see the money deducted from their wages (Kapeluck 2001).

Many studies testing the relationship between tax visibility and government expenditure have shown mixed results. Pommerehne and Schneider (1978) found that the share of 'invisible' taxes has a significantly positive effect on government expenditures. Dollery and Worthington (1996) also proved the existence of a positive correlation in their analysis of public sector growth in Greece and Australia, respectively. However, Misiolek and Elder (1988) found no evidence that tax visibility had an effect. A few studies have sought to examine the effects of withholding tax, but obtained no significant results (Feldstein and Clotfelter 1976).

The next source of fiscal illusion is deficit finance, which is postulated to obscure taxpayers' revenue assessment. People are more aware of the costs of public sector programs supported by current taxation and perceive future debt to be less costly. Hence, taxpayers tend to discount future tax liabilities created by deficit spending, and prefer debt to current taxation (Vickrey 1961; Floyd and Hynes 1978).

Examining United States government spending from 1947 to 1967, Niskanen (1978) found that the greater the ratio of government debt to GDP, the higher level of government spending.

[7] Beyond three main factors, Dollery and Worthington (1996) examined two additional hypotheses and conducted comprehensive analysis of fiscal illusion with detailed theoretical framework. They also summarized previous studies in each five hypotheses with empirical results.

However, some other scholars have arrived at opposite conclusions (Eppel and Schipper 1981; Dalamagas 1992).

A third source of fiscal illusion is the concept of revenue complexity, in which the complicated provisions of the tax system make it difficult for people to assess tax burdens (Wagner 1976). When a sufficiently large number of taxes are levied on the taxpayer, it becomes impossible for them to assess total fiscal burden to which they are subject. Wagner (1976; 51) argued that "The formation of an accurate perception regarding the price of public output would be vastly more difficult under this more complex revenue structure." Accordingly, all else being equal, the more complex the revenue system becomes, the more public spending will increase.

Empirically, the Herfindahl Index, suggested by Wagner (1976), has been used in most subsequent studies: Pommerehne and Schneider (1978), Baker (1983), and Dollery and Worthington (1996), for example, found that revenue complexity had a significant positive effect, while Misiolek and Elder (1988) found no support for the hypothesis.

Beyond the three major factors explained above, additional factors such as income elasticity and renter's illusion have been suggested as causes of fiscal illusion. The effects of progressive tax structures that increase tax bills according to income growth are less obvious than the effects of legislated changes in the tax system (Oates 1988). Many studies, however, have showed inconsistent empirical results (DiLorenzo 1983; Baker 1983; Misiolek and Elder 1988; Greene and Hawley 1991). Also, assuming only home owners are able to correctly recognize the property taxes levied on their bills, higher property taxes will be shifted onto renters via higher rents. Thus, increasing the proportion of renters in a population would be expected to have a positive effect on government expenditure. Haug (2009) proved the existence of the renter's illusion in his analysis of German local governments. However, other empirical tests have shown inconsistent results (Moomau and

Morton 1992; Carroll and Yinger 1994).

2.1.4. The Displacement Effect

Another prominent theory related to the long-term growth patterns of government expenditure is the displacement effect theory, which emphasizes the influence of social disturbances change such as wars or business depressions. It suggests that government expenditure swells rapidly after the social disturbances and does not return to previous levels even after those disturbances disappear (Peacock and Wiseman 1961). For instance, Peacock and Wiseman study British government expenditure from 1890 to 1955 and determine that government spending shifted upwards at discrete intervals after World Wars I and II.

The underlying rationale for the displacement effect theory is an individual's "tolerable burden of taxation" (Higgs 1987; Legrenzi 2004). In normal times, people tend to have tolerable tax burden of citizens fairly stable, thus growth in government expenditure is inclined to be approximately parallel to economic growth. Nevertheless, when taxpayers realize the necessity for the government to overcome the exigencies in the face of social disturbances, the tolerance for taxation grows rapidly. This results in an upward displacement of the tolerable tax burden and of government expenditure to levels that would have been unacceptable under normal conditions (Henrekson 1993). Moreover, government expenditure does not decline to the pre-disturbance level even after social disturbances end or recede, since taxpayers are already used to the incremental taxation under disturbances. In this way, government expenditure and revenue stay at a new, higher level – until another disturbance occurs. This hypothesis implies that relatively short-lived social disturbances may have long-lasting effects on public spending growth. Moreover, government expenditure does not increase in a smooth and continuous manner, but rather in steps.

In general, the displacement effect is divided into three distinct levels: strong, semi-strong, and weak. In economies subject to a strong displacement effect, the absolute value of per capita government expenditure rises in a step-like pattern (Henrekson 1993). Second, a semi-strong displacement effect refers to an increase of government expenditure following a share of national income (GDP). A weak displacement effect assumes that the ratio of government expenditures to GDP shows a similar upward-sloping trend in normal times, and is mostly affected by per capita income growth.

Previous empirical studies of the displacement effect have mostly focused on analyses of World Wars I and II, the Great Depression, and the oil crises. For example, Bonin et al. (1969) tested the UK government spending and found upward displacement of government expenditure after both World Wars. On the other hand, Nomura (1995) found evidence of the displacement effect in Japanese government expenditure after the oil crises. Other scholars have consistently showed similar results in other countries, including Andre and Delorme (1978) for France and Nagarajan (1979) for India. However, Henrekson (1994) failed to prove the existence of any displacement effect after examining abrupt expenditure increases in Sweden in the period from 1947 to 1987.

In another empirical study, Goff (1998) found the evidence of the persistence of increased defense spending after World Wars I and II: defense budgets increase during war but do not revert to pre-war levels because various groups (including lobbyists and defense contractor coalitions) pressure the government to maintain the higher spending levels. Moreover, the spending on economic development and social security after the Great Depression also shows the same pattern. Thus, Goff thus argued that increased government expenditure persists after social disturbances disappear.

2.1.5. Other Theories

Besides the main determinant theories presented above, additional theories have been suggested to explain government expenditure growth.

The *median income voter model* posits that government expenditure grows when the more voters below the median income were given franchise (Downs 1957) and when median income voters become larger as income inequality grows (Meltzer and Richard 1981). In particular, given income distribution is skewed toward left, median income voters, whose income is less than mean income level, will become larger in numbers as income inequality grows. Accordingly, they are likely to be the largest potential voting bloc in elections and exert political pressure on government to have larger redistribution programs, which results in bigger government size. Empirical studies on the link between income inequality and government expenditure have confirmed the positive relationship (Easterly and Rebelo 1993; Panizza 1999; Buracom 2007).

The *intergovernmental grant explanation* suggests that public expenditure increase when the federal governments raise the categorical sum grants to local governments (Painter and Bae 2001). It is claimed that intergovernmental grants provide state governments with additional money contributing to the size of the state's public sector relative to the size of the state's total economy (Courant et al. 1979). Additionally, the grant money "sticks" with the recipient government's spending rather than decreasing the state's revenue burden (Kapeluck 2001), this is called as "flypaper effect (Worthington and Dollery 1998)."

According to the *fiscal constraints hypothesis*, a statutory or constitutional restriction that imposes specific and binding constraints on government spending will curb government expenditure growth: examples of such restrictions include tax and expenditure limitations (TELs) (Bails 1982), budgetary balance requirements (Primo 2006), and the line item veto privilege of executive powers

(Primo 2006).

Another widely proposed and tested hypothesis, the *Baumol's cost disease model*, suggests that the relative cost of production of public goods tends to rise. This model assumes that low competition and little incentive of innovation in producing goods or services in the public sector makes productivity improvement more difficult than the private sector in which the productivity is great due to development of technology and division of labor and specialization (Buracom 2007). Hence, it is believed that increasing cost of the public sector is responsible for the increase in the size of the public sector.

The *country size explanation* claims that government expenditure as a share of GDP is smaller for large countries (Alesina and Wacziarg 1998). Although larger populations tend to have a greater heterogeneity of preferences for public goods and services, and greater heterogeneity normally implies higher costs, per capita public expenditure in larger countries actually decreases. The reason is that large populations share the costs of public goods and the process of supplying public goods as well as services is subject to significant economies of scale.

2.2. Theories of Fiscal Authority Change

Fiscal decentralization refers to the devolution of the federal government's power and responsibility of raising tax revenues and deciding on spending programs to state or local governments. The process of fiscal decentralization has received increased attention over the past decade for its two main arguments: first, fiscal decentralization can increase economic efficiency. The reason is that local governments are assumed to recognize local preferences as well as needs better, and that local government could be better tailored to the geographic benefit areas of the public goods (Oates 1972).

The second argument is that fiscal decentralization increases accountability of local officials in resource allocation. The rationale behind the argument is that because the local governments want to win the election and have to fund the services they provide, they would allocate resources for meeting the demand of local population better more efficiently (Tanzi 1996; Oates 1999).

In addition, as local governments face pressure from inter-jurisdictional competition, they might be motivated to be more innovative and accountable to their residents (Oates 1972). As a result, a large volume of literature explains the extent of fiscal decentralization and its impact on economic growth and public spending. For instance, Stansel (2005) studies the relationship between local decentralization and local economic growth in U.S. metropolitan areas, and argues that the decentralization has a positive and significant effect on economic growth. Likewise, Lin and Liu (2000) use panel data on China's provinces and the evidence indicates same tendency.

Researchers also suggest that fiscal decentralization influences levels of public spending. Some studies claim that decentralization increase efficiency of public service supply and inter-jurisdictional competition, and it would lead to government expenditure constraint (Rodden 2003). Conversely, others argue that the share of total government expenditure devoted to socially-oriented functional spending is larger in countries with decentralized political systems (Faguet and Sanchez 2009). However, there is no single widely accepted theory that shows consistent results regarding the impact of fiscal decentralization on economic growth and public sector size.

On the other hand, though controversial, it is argued that there is an inevitable tendency towards centralization of the public sector in the course of social and economic development. For instance, according to Popitz (1927), the central government tends to attract competencies of state governments over time, as there are no clear criteria for the distribution of most functions among different levels of government. Popitz also claims that central legislation is necessity for integrating

economic area as well as providing uniform living conditions and welfare service. Furthermore, state and local governments normally lack of financial resources, and they face considerable inter-jurisdictional differences in terms of size and tax efforts. These problems are believed to impede their ability to execute central government legislation. Thus, certain scholars contend that fiscal centralization allows national governments to mobilize resources for the promotion of economic activities in the international arena and to bring about greater equality of opportunities across countries (Diaz-Cayeros 2005).

Beyond the debate over the effectiveness of fiscal decentralization, current literature has identified certain causes of fiscal decentralization (Letelier 2005). They include, but are not limited to: income, population and population density, diversity of ethnic groups, urbanization, inter-regional transfer, and trade orientation. As for population and diversity of ethnic groups, the literatures illustrate positive effect on fiscal decentralization (Litvack and Oates 1971; Panizza 1999), whereas the arguments of urbanization and trade orientation show the relationship otherwise. The influence of income (Wallis and Oates 1988; Hutther and Shah 1998) and population density (Panizza 1999), however, show mixed relationship with decentralization.

In addition, the number of studies identifies the effect of such events as the September 11 terrorist attacks and Hurricane Katrina in the United States on the expansion of the federal government. In particular, some researchers have claimed that a national security emergency would compel citizens to comply with increased federal government authority and spending, in the interest of defending national safety (Conlan 2006; Posner 2007; Birkland and Waterman 2008).

2.3. Summary and Conclusion

As noted above, a great deal of research on the causes of government expenditure growth has been conducted utilizing diverse theories, methodologies, and data. The vast majority of studies have shown that none of the dominant single-factor explanations seem capable of accounting for changes in governmental spending (Lowery and Berry 1983). Likewise, most of the theories lack consistent support. In general, however, three characteristics can be found across the breadth of those studies.

First, most studies of government expenditure growth have primarily examined the effects of certain determinants on the aggregate size of government expenditure (Shelton 2007). Those studies have tested a combination of growth hypotheses on total expenditure in one nation or across several nations (Rice 1986; Garand 1988; Kapeluck 2001; Ram 2008; Kalam and Aziz 2009). Other studies have examined theories about sub-policy spending in isolation. For example, a number of researchers have investigated determinants of social welfare spending, public education spending, infrastructure spending, health care spending, and defense spending. Among those examinations, the importance of social welfare and education spending are always highlighted, and research on several determinants of health spending is also abundant. In contrast, there are relatively few studies examining infrastructure and public safety spending as dependent variables.

On the other hand, typical variables such as income, population size and density, age composition, and unemployment rate have been identified repeatedly as determinants of both total spending and major functional spending. Table 2-1 shows the determinants of total spending and major sub-policy spending categories and empirical results of studies focused on these determinants.

Table 2.1. Summary of Literature on Government Expenditure Growth

Variables	Wagner's Law				Age Composition	
	Per Capita GDP		Population density		Youth	
	(+)	(-) /Insignificant	(+)	(-) / Insignificant	(+)	(-) / Insignificant
Total Government Expenditure	Thornton (1999) Abizadeh and Yousefi (1992) Garand and Kapeluck (2000) Islam (2001) Chang (2002) Akitoby et al. (2006) Sideris(2007) Lamartina and Zaghini (2008) Kumar et al. (2009) Kalam and Aziz (2009)	Cameron (1978) Garand (1988) Ferris and West (1995) Iyare and Lorde (2004) Narayan et al. (2007) Ziramba (2008) Durevall and Henrekson (2010)	Burchell and Mukherji (2003) Cox and Utt (2004) Litman (2004) Sideris (2007) Holcombe and Williams (2008) Kalam and Aziz (2009)	Burchell and Mukherji (2003)(-) Cox and Utt (2004)(-) Litman (2004)(-) Kau and Rubin (1981)	Berry and Lowery (1984) Lewis-Beck and Rice (1985) Dye and MacManus (1990) Garand (1993) Garand and Kapeluck (2000) Kapeluck (2001) Painter and Bae (2001)	
Social Welfare Expenditure	Courakis et al. (1993) Visco (2001) Than Dang et al. (2001)					Galasso and Profeta (2004)(-)
Education Expenditure	Falch and Rattso (1997) Fernandez and Rogerson (1997) Marlow and Shiers (1999) Baqir (2002) Akanbi and Schoeman (2007) Busemeyer (2006)				Marlow and Shiers (1999) Ahlin and Johansson (2001) Painter and Bae (2001) Akanbi and Schoeman (2007)	
Economic Service Expenditure	Randolph et al. (1996) Canning and Pedroni (1999) Randolph et al. (1996) Fay (2000) Busemeyer (2006)		Heller and Diamond (1990)	Randolph et al. (1996) (-) Fay (2000)(-)		
Health Expenditure	Culyer (1989) Milne and Molana (1991) Gerdtham and Jonsson (1991) Hitiris and Posnett (1992) Karatzas (2000) Martins (2006)					
Defense Expenditure	Murdoch and Sandler (1990) Hartley and Sandler (1990) Hewitt (1991) Dunne and Mohammed (1995) Chletsos and Kollias (1997) Al-Yousif (2002) Collier and Hoeffler (2002) Goldsmith (2003)	Fritz-Assmus and Zimmerman (1990) Looney (1997) Gupta (2001)			Sanz and Velazquez (2002)	Shelton (2007)(-)

Table 2.1. (Continued) Summary of Literature on Government Expenditure Growth

Variables	Age composition		Counter-Cyclical Policy Theory (Unemployment)		Openness of Economy	
	Elderly (over 65)					
	(+)	(-) /Insignificant	(+)	(-)/Insignificant	(+)	(-)/Insignificant
Total Government Expenditure	Berry and Lowery(1984) Lewis-Beck and Rice(1985) Dye and MacManus (1990) Garand(1993) Garand and Kapeluck (2000) Kapeluck (2001) Painter and Bae (2001) Sanz and Velázquez (2007) Shelton (2007)	Razin Sadka and Swagel (2002)(-) Akanbi and Schoeman (2007)	Cameron (1978) Lewis-Beck (1985) Rice (1986) Garand (1993) Abrams (1999) Christopoulos and Tsionas (2001) Berry and Lowery (1984) Painter and Bae (2001) Garand and Kapeluck (2000) Kapeluck (2001) Brady et al. (2005) Foucalt at al. (2008) Potrafke (2007)		Huber, Ragin, and Stephens (1997) Rodrik (1998) Swank (1988) Garen and Trask (2005) Kittel and Winner (2005) Shelton (2007) Gemmel et al. (2008) Ram (2008)	Garrett (2001)(-) Winner (2005)(-) Molana et al. (2004) Gemmel et al. (2008)
Social Welfare Expenditure	Svallfors (2003, 2004) Galasso and Profeta (2004) Sanz and Velazquez (2007) Shelton (2007)	Andreß, and Thorsten (2001)Razin Sadka and Swagel (2002)(-)	Lewis-Beck and Rice (1985) Rice (1986) Brady et al. (2005) Hicks and Zorn (2005)	Brauninger (2005)	Hicks and Swank (1992) Huber et al. (1997) Balle and Vaidya (2002) Wibbels (2006) Gemmel et al. (2008) Eipifani and Gancia (2009)	Garret and Mitchell (2001)(-) Kaufman and Segura-Ubiergo (2001)(-) Dreher (2006)
Education Expenditure	Borge and Rattso (2008) Fletcher and Kenny (2008)	Painter and Bae (2001)(-) Brunner and Balson (2004)(-) Grob and Wolter (2005) (-) Busemeyer (2006, 2007) (-) Iversen and Stephens (2007) (-) Cattaneo and Wolter(2009)	Grob and Wolter (2005)		Alesina and Wacziarg (1998) Kaufman and Segura-Ubiergo (2001) Huber et al.(2001) Avelino et al.(2005) Gemmel et al. (2007) Shelton (2007)	Figlio and Blonigen (2000) (-)
Economic Service Expenditure		Hitiris and Posnett (1992) Gerdtham and Jönsson (1991) Zweifelet et al. (1999)			Alesina and Wacziarg (1998) Figlio and Blonigen (2000) Shelton (2007)	
Health Expenditure	Rice (1986) Weinblatt and Luski (1998) Hitiris (1999) Visco (2001) Than Dang et al. (2001) Galasso and Profeta (2004) Seshamani and Gray (2004) Martins(2006) Dormont et al.(2007) Shang and Goldman (2007)		Potrafke (2008 b)		Huber and Stephens (1997) Kaufman and Segura-Ubiergo (2001) Balle and Vaidya (2002) Huber et al.(2001)	
Defense Expenditure		Sanz and Velazquez (2007) (-) Davoodi et al. (1999) Gupta *el al.* (2001)(-)				

Table 2-1. (Continued) Summary of Literature on Government Expenditure Growth

Variables	Party Control	Political Business Cycle (Election)	
		(+)	(-) /Insignificant
Total Government Expenditure	Lowery and Berry (1983) Lewis-Beck and Rice (1985) Higgs (1987) Budge and Hofferbert (1990) Alesina et al.(1993) Cusack (1997) Brauninger (2005) Teiller(2006) Potrafke (2007)	Nordhaus (1975) Garand and Kapeluck (2000) Seitz (2000) Besley and Case (2003) Brender and Drazen (2004) Grier (2008) Vergne (2009)	Potrafke(2007)
Social Welfare Expenditure	Moller et al. (2003) Potrafke (2007)	Seitz (2000)	
Education Expenditure	Boix (1997) Huber and Stephens (2001) Oberndorfer and Steiner (2006) Potrafke (2007)	Seitz (2000)	
Economic Service Expenditure	Busemeyer (2006) Potrafke (2007)	Seitz (2000)	
Health Expenditure	Immergut (1992) Potrafke (2007)		
Defense Expenditure	Correa and Kim (1992) Potrafke (2007)		

Variables	Coalition Government		Bureau Voting	
	(+)	(-) / Insignificant	(+)	(-) / Insignificant
Total Government Expenditure	Weingast et al. (1981) Roubini and Sachs (1989) de Haan and Sturm (1997) Perotti and Kontopoulos (1998) de Haan et al. (1999) Volkerink and de Haan (2001) Hagen and Vabo (2005) Schaltegger and Feld (2004) Ashworth et al.(2005)	Padovano and Venturi (2001) Balassone and Giordano (2001) Freitag and Sciarini (2001) Tsebelis (2004)	Migue and Belanger (1974) Dye and MacManus (1990) Ferris and West (1995) Painter and Bae (2001) Kapeluck (2001) Garrett and Rhine (2006)	Berry and Lowery (1984, 1987) Garand and Kapeluck (2000)
Education Expenditure			Kapeluck (2001)	
Health Expenditure	Potrafke (2008)			

Table 2-1. (Continued) Summary of Literature on Government Expenditure Growth

Variables	Fiscal Illusion					
	Indirect tax ratio		Deficit Finance		Complexity in Revenue System	
	(+)	(-) / Insignificant	(+)	(-) / Insignificant	(+)	(-) / Insignificant
Total Government Expenditure	Pommerehne and Schneider (1978) Karavitis (1987) Oates (1988) Dollery and Worthington (1995) Kapeluck (2001) Sausgruber and Tyran (2005)	Feldstein and Clotfelter (1976) Misiolek and Elder (1988)	Vickrey (1961) Buchanan and Wagner (1977) Diamond (1977) Floyd and Hynes (1978) Ashworth (2005)	Oate (1972) (-) Epple and Schipper (1981) (-) Dalamagas (1993)(-)	Wagner (1976) Pommerehne and Schneider (1978) Baker (1983) Dollery and Worthington (1995) Oates (1999)	

On top of these different impacts of some determinants across total spending and functional spending categories, functions themselves also prove to be complementary or substitutive to a certain degree (Sanz and Velazquez 2002). Indeed, Heller and Diamond (1990) and Clements et al. (1998) found that the significance of the other functions increased the magnitude of spending on economic services and social security programs. Likewise, Looney (1997) claimed that defense and infrastructure spending are competitors, while Marlow and Shiers (1999) showed that spending on education is complementary to spending on defense and on public order and security.

In this respect, simultaneous examination of the impacts of certain determinants on both total spending and major functional spending is necessary in order to conduct sophisticated testing of government expenditure change theories. This effort is important because the ways in which public resources are allocated between competing budgetary priorities, and the various trade-offs among the different categories of expenditures, are of major concern to fiscal policy makers. Comparative analysis of major functional spending areas is also highly significant because the functional composition of government expenditure has been regarded as a decisive factor in economic growth (Devarajan et al.

1996; Alesina and Perotti 1997).

A second distinctive feature of the current literature is that the majority of previous studies have been conducted to explain general patterns of governmental growth over time without examining in depth the impacts of social disturbance. It has been argued that the historical governmental growth has been achieved mainly through a few social shocks rather than a steady increase in GDP or population. Nevertheless, a wide range of studies covering the periods of World Wars I and II and oil crises (Rice 1986; Rockoff 1999) have handled each social disturbance simply as one determinant with dummy variable. Such studies are less likely to examine the different influences of such factors as unemployment rates and per capita income on governmental growth before and after periods of social disturbance.

Moreover, previous studies of the displacement effect have been limited to analyses of World Wars I and II, the Great Depression, and the oil crises. However, social disturbances such as financial crises, economic transitions, and natural disasters has been steadily increasing in number, having a great influence on government expenditure. Therefore, in order to better understand how government expenditure changes in an environment characterized by long periods of stability interrupted by rare but dramatic periods of change, it is necessary to examine patterns of government expenditure before and after social disturbances and to extend the analysis of the displacement effect to include other social disturbances.

Third, competing views on fiscal authority change have not paid much attention to the influence of social disturbances on the extent to which fiscal decentralization differs. While recent studies on the centralization of public policies have contended that the federal government of the United States has come to exert greater decision making power in some areas, a sufficiently detailed analysis of changes in fiscal decentralization following social disturbances has not been conducted.

For example, while Posner (2007) showed that significant nationalization and centralization of policy occurred in major areas traditionally controlled by state and local government (such as education, welfare, and homeland security) under the administration of President George W. Bush, he did not provide budgetary evidence of fiscal centralization. Therefore, looking at the extent to which and the sub-policy areas where fiscal centralization occur as a result of social disturbances will help expand current studies.

Chapter 3

Data and Methods

Based on the theories discussed in the previous chapter, this chapter specifies a series of empirical models and describes the relevant data and measures.

The first test identifies the factors that contributed to the growth of total spending and to changes in the amount of spending in functional budget categories. This establishes some basic patterns and, in particular, identifies some of the differences and similarities between total spending and other sub-policy spending. Variables operationalizing theories discussed in the literature will be specified and a model will be developed employing mainly the Driscoll/Kraay (DK) method in comparison with the Panel Corrected Standard Error (PCSE) method to examine the determinants of government expenditure.

The second test establishes the existence of the displacement effect and contrasts spending levels and changes prior to (1972-1990) and after (1991-2006) German reunification. This study uses the Chow test and several other empirical methods to determine whether changes in the dynamics of German government expenditure are associated with reunification.

The third test focuses on the fiscal authority change by comparing the distribution of spending between federal and state governments prior to (1972-1990) and after (1991-2006) reunification.

3.1. Model Specifications

3.1.1. Model of Government Expenditure Size and Composition

This study employs a pooled time-series cross-sectional (TSCS) design analyzing over-time

and across-state variation in change in government expenditure. TSCS data are characterized by repeated observations on fixed units such as states or nations. One of the major advantages of panel data is the inter-temporal dynamics and the individuality of the entities offer the ability to control the effects of missing or unobserved variables (Hsiao 2003). This study collects data on government expenditures at the federal level and for 16 state governments for the 35-year time period from 1972 through 2006. Pooled design involves combining the cross-sectional data on the 16 spatial units and 35 time periods to produce a set of $N \times T$ observations; the study data set contains 495 observations, since data for East German states is only available from 1992-2006. The critical assumption of TSCS models is that of "pooling"; that is, all units are characterized by the same regression equation at all points in time (Beck and Katz 1995). Given this assumption, the generic TSCS model can be written as equation 1:

$$y_{it} = \beta x_{it} + \varepsilon_{it} \qquad i=1, \ldots, N; t=1, \ldots, T$$

where x_{it} is a K vector of exogenous variables, ε_{it} is a random error term and observations are indexed by both unit (i) and time (t). Thus, y_{it} and x_{it} refer respectively to dependent and independent variables for unit i and time t. This framework allows researchers to explain some range of cross-sectional and longitudinal co-variation between government expenditures and explanatory variables that are hypothesized to affect change in government expenditures.

Ordinary Least Squares (OLS) is an optimal estimator for the TSCS model described above if the errors follow a simple, spherical form. In particular, OLS requires that the error processes have a constant variance (homoskedasticity), and that observations of the error term are independent of each other. However, due to the nature of the data, errors of TSCS models are generally considered to be complex and non-spherical; they tend to be autocorrelated, cross-sectionally correlated, and heteroskedastic. As a result, OLS estimators will be inefficient when

applied to TSCS models – and more importantly, standard errors will not be accurate. Beck and Katz (1995) referred to these statistical problems inherent in TSCS data as the *panel error assumptions*.

First, it is likely that errors in TSCS models will show 'panel heteroskedasticity', in which the variance of the error process differs across cross-sectional units due to characteristics unique to the units. A modified Wald test was performed, which confirmed evidence of groupwise heteroskedasticity in the data set used in this study. Second, it may be expected that TSCS errors will be contemporaneously correlated. In other words, observations might be serially correlated such that errors in country or state i at time t are correlated with errors in country or state j at time t. This is likely in the context of examining states within a single country, since it can be assumed that state economies are linked through correlated disturbances. The Breusch-Pagan test for cross-sectional independence in the residuals of a TSCS model revealed that there are contemporaneously correlated errors in the data set. Finally, it is possible that within units the errors are not independent from one period to the next. This is because observations and traits that characterize pooled designs tend to be interdependent across time. Therefore, it is assumed that the temporal component of the data leads to first-order serial correlation. The Wooldridge test for serial correlation in panel data models indicated strong evidence of autocorrelation for all specifications of the model.

In an early attempt to account for temporal and spatial dependence in the residuals of time-series cross section models, as well as for heteroskedasticity, Parks (1967) proposed an algorithm based on feasible generalized least squares (FGLS) that was subsequently popularized by Kmenta (1986). This procedure consists of two sequential transformations designed to first eliminate serial correlation of the errors and then eliminate contemporaneous correlation of the errors. The process is described in Beck and Katz (1995) and consists of the following steps. First, Equation 1 is

estimated by OLS. The residuals from this estimation are used to estimate the unit-specific serial correlation of the errors, which are then used to transform the model into one with serially independent errors. Residuals from this estimation are then used to estimate the contemporaneous correlation of the errors, and the data is once again transformed to allow for OLS estimation with the now-spherical errors. It is also noted that the second correction for the contemporaneous correlation of the errors automatically corrects for any panel heteroskedasticity.

This method was the most utilized approach for TSCS analysis in comparative political economy until the mid-1990s. However, since Beck and Katz (1995) introduced Panel Corrected Standard Errors (PCSE) as an alternative approach to FGLS, this method has become most widely used by researchers. Their Monte Carlo analysis considered the FGLS corrections for contemporaneously correlated errors and serially correlated errors separately and found substantial overconfidence in both sets of experiments, especially in the transformation to eliminate contemporaneous correlation of errors[8]. Consequently, Beck and Katz (1995) convincingly argued that a superior way to handle the non-spherical error structures in TSCS analysis is to retain OLS parameter estimates but replace OLS standard errors with panel-corrected standard errors that correct for contemporaneous error correlation and for panel heteroskedasticity. Through Monte Carlo experiments, they demonstrated that PCSEs consistently outperform FGLS methods in terms of accuracy and efficiency in almost every situation. However, PCSEs can only be calculated once serial correlation has been removed from the error terms. Beck and Katz (1995) proposed addressing serial correlation by incorporating a lagged dependent variable rather than by estimating an autoregressive model on residuals, i.e. AR1 correction. They argued that this approach makes it

[8] According to Kristensen and Wawro (2003), the underlying flaw of FGLS is that the covariance matrix of the errors is never known and can only be estimated; because it does not take into account the variability in the estimates of error parameters, this method will yield deflated standard errors.

easier for researchers to examine dynamics, whereas an AR1 transformation can obscure "true" relationships within the data. Their Monte Carlo simulations confirmed that lag correction outperforms Prais-Winsten (AR1) transformation.

Despite the popularity of the Beck and Katz approach among researchers, there is some debate about its robustness. Mikhaylov and Marsh (2009) noted that researchers often use PCSE as a "quick fix" in TSCS models without considering the underlying assumptions or justifying their estimation method theoretically. Chen, Lin, and Reed (2006) evaluated the efficiency of the PCSE approach and concluded that the strong performance of the PCSE estimator reported by Beck and Katz was "an artifact of the particular parameter values they selected for their simulations." They performed a different set of Monte Carlo experiments using practical data situations and found that the PCSE estimator is almost always less efficient than the FGLS method. Li and Maddala (1997) also suggested that OLS estimation with panel-corrected covariance matrix estimation is inconsistent with the use of lagged dependent variables. Kristensen and Wawro (2003) questioned further whether introducing a lagged dependent variable would even remove all elements of serial correlation – ; and if it does not, a key assumption required for the consistency of PCSEs is violated.

A final issue with the PCSE approach is that since each element in the variance-covariance matrix is estimated, PCSE does not allow for the possibility of arbitrary autocorrelations across units. The assumption that cross-sectional correlations are equal for every pair of cross- sectional units does not seem logical for units that are not randomly sampled. Driscoll and Kraay (1998) argued that cross-sectional dependence in disturbances arises due to the presence of an unobserved factor f_t, which is common to all cross-sectional units. Since the factor follows an autoregressive process of order 1, both contemporaneous and lagged spatial dependence are present, which can

substantially bias standard error estimates.[9] The possibility of lead-period cross-sectional dependence cannot be ruled out either. This suggests that PCSE, like FGLS, imposes potentially untrue parametric restrictions on the data. Therefore, this study has selected the Driscoll/Kraay (DK) method to calculate standard errors using a nonparametric covariance matrix estimator that is heteroskedasticity- and autocorrelation-consistent and is robust to more general forms of spatial and temporal dependence. Additionally, Hoechle (2007) pointed out that the finite sample properties of the PCSE estimator are rather poor if the T/N ratio is small, whereas Monte Carlo evidence shows that the DK method works well in situations where T is small or N is quite large.

Though not as widely cited as PCSE, the Driscoll/Kraay method has been used by many political scientists to analyze panel data in the presence of cross-sectional autocorrelation.[10] The use of the DK method should continue to expand since Hoechle (2007) introduced a new Stata command that estimates pooled OLS/WLS regression models with DK standard errors and is applicable to unbalanced panels. Driscoll and Kraay's (1998) methodology utilizes the standard Newey and West (1987) heteroskedasticity- and serial-correlation-consistent covariance matrix estimator applied to the sequence of cross-sectional averages of the moment conditions.[11] Hoechle (2007) also confirmed that adjusting the standard error estimates in this way guarantees that the covariance matrix estimator is consistent, independently of the cross-sectional dimension N.

One advantage of using this method is that OLS parameters can be retained, since all panel error assumptions are accounted for. Moreover, DK standard errors recognize that cross-sectional

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[9] For example, different states may react differently to common disturbances, or contagion effects may spread across states only after some lag (Driscoll and Kraay 1995).

10 See, for example, Kano and Ohta (2005), Foote (2007), Maddison (2007), Egger and Raff (2007), Murphy and Siedschlag (2008), Golden and Picci (2008), Faber and Janssen (2008), Abdulai and Ramcke (2009), Mikhaylov and Marsh (2009), Klein, Leibrecht, and Onaran (2009), Straathof and Linders (2009).

[11] In more detail, Driscoll and Kraay explains that asymptotic theory indicates this approach can accommodate a wide variety of cross-sectional (spatial) correlations and that the size of the cross-sectional dimension does not affect the ability to obtain large T-asymptotic results.

correlation in panel data is likely to differ across spatial and temporal components. This addresses the problematic (but often overlooked) notion that cross-sectional units may react differently to a common factor. Driscoll and Kraay (1998), Hoechle (2007), and Foote (2007) provided Monte Carlo and empirical evidence that failure to correct for cross-sectional correlations will lead to imprecise standard errors. On the other hand, the covariance matrix estimator used in the DK model exhibits very little finite sample bias and outperforms other techniques when spatial correlation is present. Based on a comprehensive comparison of the models, this study will use OLS with Driscoll/Kraay standard errors, lag 1 specification. Results from the PCSE method will be included in the Appendix for comparison.

3.1.2. Estimating the Displacement Effect

In their seminal study on the displacement effect, Peacock and Wiseman (1961) did not suggest any empirical inquiry methods to test their theory. Instead, the authors relied on graphs and charts to display a stepwise pattern of increased public spending brought on by social disturbances. The absence of a universally accepted test has allowed many researchers to propose their own methodologies for examining the displacement effect theory. As a result, several competing methodologies have been recommended to identify statistical evidence of the displacement effect. This study has selected four common approaches from previous studies: the Chow test; Upward Intercept Shift; GDP and tax revenue elasticity; and predicted expenditures regressed against actual expenditures (Nomura 1995; Nagarajan 1979; Goff 1998; Legrenzi 2001; Legrenzi 2004).

An important limitation of each of these tests is that they do not define the time-point of structural change. Therefore, the timing of structural change must be determined in order to correctly examine the displacement effect. The position of the change-point can be selected based

on *a priori* knowledge of events; in this case it is expected that there will be significant change in government budget size following reunification in 1991. However, empirical evidence is required to verify this assumption. As a result, this study will calculate the modified Wald test statistic for possible time-points of structural change and regard the time-point which maximizes the value of the test statistic as a candidate for the location of a change-point (Nomura 1995). As a measure of the degree of heteroskedasticity, the maximum value of the modified Wald statistic indicates a time-point for which parameter instability is the greatest, or when model parameters are subject to the most change. Once this time-point has been verified testing can proceed.

Diamond's (1977) interpretation of the displacement effect as a structural change or structural break in the public expenditure series claimed that the *ceteris paribus* assumption that tastes, preferences, and institutions will remain unchanged following the social disturbance is incorrect.[12] Therefore, a structural change between two periods should be accompanied by a change in the estimated parameters of the model as well by as changes in the error structure. Thus the Chow test is employed to test the null hypotheses that there is no statistically significant difference in the model parameters before and after reunification. However, a statistically significant result cannot be used as a stand-alone measure of the displacement effect, since it does not interpret the direction of change. Tussing and Henning (1991) pointed out that support for the hypothesis of upward displacement is only evident if the absolute values of coefficients continue to increase or decrease in their respective directions.

In order to test whether German reunification constitutes a structural break, the Driscoll/Kraay model will be used, but will be regressed against total expenditures per capita

[12] He noted that "since a structural break posits two distinct regimes before and after the social upheaval, instead of separately testing for the stability of the constant term and the slope coefficient, a total test of structural ability should be applied" (Diamond 1977; 397).

separately for the two time periods. The parameters for the model from 1972-1990 will be compared to the parameters for the model from 1991-2006. A statistically significant Chow test statistic will support the displacement hypothesis only if the coefficients move in the expected directions. A valid critique of this methodology is that like any F-test, the Chow test will not be robust in the presence of heteroskedasticity. To address this shortcoming, Nomura (1995) proposed using a modified Wald statistic to measure displacement when the assumption of homeskedastcity is violated. Both statistics have been included for this study.

As previously mentioned, the Chow test does not distinguish between upward and downward displacement. An examination of the model coefficients provides some insight as to the direction of change; however, another way in which direction can be empirically tested is by including a time dummy variable set equal to 1 for the period after reunification. Pryor (1967) concluded that an upward intercept shift in the estimated model when a time dummy variable is included provides evidence of an upward displacement effect. Additionally, a positive and statistically significant coefficient of the dummy variable would indicate that reunification led to an increase in spending, holding all other variables constant. Although this test does not explain changes in the determinants of spending, Henrekson (1994) points out that of the displacement tests most commonly utilized by scholars, this is the only that uses time as an explanatory variable.[13]

The third approach used in this study relies on the empirical test devised by Gupta (1967), which tests for the displacement effect by looking for changes in the income elasticity of government expenditures with social upheavals. He fitted the following equation for several countries separated by periods of time before and after war:

[13] This is particularly important, he noted, because "the original Peacock-Wiseman hypothesis was expounded as a function of time, an appropriate treatment of time is crucial in an empirical test" (Henrekson 1994; 252).

$$\ln G_t = a + b(\ln Y_t) + \varepsilon_t,$$

where G is per capita public expenditure, Y is per capita GDP, and ε is a well behaved error term. The slope coefficient b estimates the GDP elasticity of government expenditure. Gupta concluded that an increase in the value of b immediately following social upheaval was evidence of an upward displacement, indicating a statistical propensity to spend more relative to GDP. This study refines the Gupta method by introducing a time component similar to that used by Goff (1998) and Tussing and Henning (1991), who looked at the changes in public expenditure over time with dependent variable as $G_t - G_{t-1}$. Instead, the equation developed for this study adds the logged lagged dependent variable into the equation to address the time series nature of the data. This also corrects for any potential serial correlation. Thus, the change in b_1 for the following equation will be examined:

$$\ln G_t = a + b_1(\ln Y_t) + b_2(\ln Y_{t-1}) + \varepsilon_t$$

Although the Gupta test is widely used as an empirical proxy for Wagner's Law as well, it fails to consider the role of fiscal revenue in the process (Legrenzi 2004). Similarly, it is surprising that so few tests have been designed to test the impact of tax revenues since Peacock and Wiseman themselves highlighted this as an essential aspect of the displacement effect: "People will accept, in a period of crisis, tax levels and methods of raising revenue that in quieter times would have been thought intolerable, and this acceptance remains when the disturbance itself has disappeared. As a result, the revenue and expenditure statistics of the government show a displacement after periods of social disturbance (Peacock and Wiseman 1961). In his study of Italian public expenditures, Legrenzi (2004) tested the elasticity of a TAXFIN variable, the ratio of public expenditure financed by tax revenues (TaxRev / Total Expenditures) regressed against total public expenditures. He concluded that "if tax payers demand more public expenditure and they are willing to finance it via

taxes, TAXFIN will be positive. On the other hand, "if taxpayers are not willing to finance G via taxes, then TAXFIN will have a negative coefficient" (p.195).

$$\ln G_t = a + b_1(TAXFIN) + b_2(\ln Y_{t-1}) + \varepsilon_t$$

Therefore, an increase in the slope coefficient of TAXFIN across sub-periods would indicate that the tolerable level of taxation increased and was maintained following reunification, lending support to the revenue side of the displacement effect theory.

A final method used to test the upward nature of the displacement effect was put forth by Tussing and Henning (1991). This method uses the early period regression model to forecast later period values of the dependent variable and then regressing the actual values on those forecasted. If there is upward displacement, the early structure should underpredict; that is, the actual values should significantly exceed the forecasted values. Tussing and Henning also did the opposite, forecasting the early period values from the later period regression, and then regressing the actual values on the forecasted ones. In this case, if there is displacement, the later structures should overpredict; that is, the actual values should be less than the forecasted values.

3.1.3. Estimating Fiscal Authority Change

Because it is not easy to measure fiscal decentralization, researchers have used several methods to do so. Some of the most common measures used are revenue decentralization, expenditure decentralization, and fiscal autonomy. As fiscal decentralization reflects how responsibilities for tax revenues and public expenditures are distributed among different tiers of government, this study employs two different indicators.

To begin with, in order to determine whether change in the fiscal decentralization of total spending and major sub-policy spending occurred after reunification, this study examines the

traditional expenditure ratio (ER), which is widely used by researchers to measure the devolution of fiscal authority. The ER presents the ratio of total sub-national government expenditure to total government expenditure. The closer the ratio is to 1, the higher the degree of decentralization. For this study, sub-national government expenditure is defined as the sum of state and local expenditures; total government expenditure is defined as the sum of federal, state, and local expenditures. However, Halder (2007) argues that in order to avoid double counting, federal grants given to state and local governments need to be subtracted from the total government expenditure. The reason for this is that the federal government will consider the grants as an expense, and upon spending that money, the state and local governments will consider this as an expense as well. Thus, subtracting intergovernmental grants from total expenditure ensures that expenditure is only considered once. The equation is as follows:

$$ER = \frac{\text{Total Sub National Expenditure}}{\text{Total Government Expenditure} - \text{Intergovernmental Grants}}$$

The strength of this measure is that it can be used to assess the trend in decentralization for total spending as well as for spending in each sub-policy area.

The major limitation of the Expenditure Ratio, however, is that it fails to consider how changes in revenue may also affect the level of decentralization. Therefore, the second indicator examined in this study explores the interaction of both aspects of decentralization. Martinez-Vazquez and Timofeev (2009) introduce a new measure, the Composite Ratio (CR), which combines the information captured by the Expenditure Ratio and the Revenue Ratio. This is necessary because any characterization of fiscal decentralization should include the extent of local spending, the extent of local revenue generation, and the extent of unconditional transfers (revenue sharing). The Revenue Ratio (RR) is defined as the ratio of sub-national revenue to total government revenue.

Again, sub-national revenue is the sum of state and local revenues and total government ratio is the sum of federal, state, and local revenues. This study excludes intergovernmental grants in the calculation of revenue since it is already accounted for on the expenditure side. The equation for the Composite Ratio is as follows:

$$CR = \frac{\text{Revenue Ratio}}{1 - \text{Expenditure Ratio}}$$

This ratio refers to the ratio of the most centralized category (being both centrally financed and centrally administered) to the most decentralized category (being both sub-nationally financed and sub-nationally administered), assuming the central government does not receive grants from sub-national units. Martinez-Vazquez and Timofeev (2009) argue that unlike other attempts to combine the Expenditure and Revenue Ratios, in their measure, revenue decentralization and expenditure decentralization reinforce each other. It should also be noted that the interpretation of the CR by Martinez-Vasquez and Timofeev differs from the traditional expenditure and revenue measures. For the CR, a ratio close to zero indicates that "most public services are financed and delivered by the central government" whereas a ratio greater than one suggests that "a large fraction of public expenditures is financed and delivered by local governments" (Martinez-Vazquez and Timofeev 2009). This indicator can only be computed for overall spending since detailed revenue data at the sub-policy level is not available.

3.2. Data and Sources

This research utilizes time series and cross-section data on German government expenditure from 1972 to 2006. The dataset contains German government expenditures for six major sub-policy spending categories (social security, education, economic services, health, public safety, and defense)

in both the federal government and 16 states governments.

Each sub-policy category aggregates spending for a number of different government services and programs: Social Security, consisting of support for pensions, unemployment insurance, child pay, maternity leave, youth, living expenses, social help payments, and the formation of wealth; Education, consisting of support for schools, universities, and teachers; Economic Services, consisting of support for alimentation, farming and forestry, energy and water management, mining, manufacturing, construction, regional economic growth, administration of streets and bridge building, federal highways, local roads, communal roads, administration of waterways and ports, and shipping; Health, consisting of support for hospitals, sports and recreation, and clean air, water, and earth; Public Safety, consisting of support for border patrol, police, courts, and attorney generals offices; and lastly Defense, consisting of funding for the active military, payments for institutions serving veterans, and to war victims. While the burden of defense spending rests primarily with the federal government, the individual state governments still allocated funds for defense related items, such as veterans support or war damages. Although these items are listed as Social Security expenditures, this study classifies them as Defense spending items in order to track the variations of defense related spending taking place at the state level over time.

Most of the data used to develop the dependent variables are obtained from the Yearbook (1972-2006) of the German Federal Statistical Office (Statistisches Jahrbuch). Some data are cross-checked with data collected from the Government Finance Statistics (GFS) published by the International Monetary Fund (IMF), the finance ministry, and the central bank in Germany. Since expenditure data from before January 1, 2002 is listed in Deutsch Mark, this study converts all values into Euro using the official constant conversion factor 1 Euro = 1.95583 DM.

Data on the independent variables are obtained from a number of sources. Data on socio-

economic variables are drawn from the online listing in the German Statistical Office's GENESIS website and the Yearbook (1972~2006) of the German Federal Statistical Office. Per capita GDP and population density along with data on the age composition of the population and unemployment rate are acquired from the online listings in GENESIS website.[14] The data on the level of economic openness is sourced from the Yearbook (1972~2006) of the German Federal Statistical Office. Among institutional variables, data on tax revenue and the number public employees are compiled from the special publication of the German Statistical Office.[15] Budget deficit data are taken from Chapter 22 of the Yearbook (1972~2006) of the German Federal Statistical Office.[16]

Of political variables, election data as well as the election results were taken from the states' individual election monitoring web sites and from the web site of the Federal Returning Officer.[17] More detail electoral results of party control and coalition government data are retrieved from periodical publications of the German Federal Statistical Office.[18]

3.3. Measurement of Variables

3.3.1. Dependent Variables

The most commonly used indicators of government size are government expenditures derived from national accounts. Scholars use various indicators to represent the size of government expenditures (Dye and MacManus 1990).

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[14] This website is available online at, https://www-genesis.destatis.de/genesis/online
[15] Special Publication 14, Volume 6 of the German Statistical Office (Fachserie 14, Reihe 6, 1972-2006)
[16] Statistisches Jahrbuch für die Bundesrepublik Deutschland, 1972-2006
[17] This website is available online at, http://www.bundeswahlleiter.de/en/index.html
[18] Data on electoral results at the state level is from Chapter 3 of "Results and comparative figures of former elections to the Bundestag, the European Parliament and the Länder parliaments as well as structural data on Bundestag constituencies" (Federal Statistical Office, 4-yearly), while the federal level results are found in Chapter 1.

One such indicator is the ratio of government expenditures to total economic output, which measures government growth relative to the private sector. Another indicator is the ratio of government expenditures to personal income, which measures government growth relative to the public's ability to sustain the policies and programs of the government. Per capita expenditure, which measures government growth relative to population size, is also a good measure of government size.

These three measures are relative measures and are useful for different research purposes. For example, if the question concerns why government expenditures grow relative to the overall economy, the first measure is most appropriate. The second measure is most appropriate if the subject is how taxpayers can afford to provide funds for government activities or how taxpayers' benefit relative to burden differs among countries. This study employs the third measure, per capita government expenditure, which is very useful in examining the government's role in the domestic economy and is less susceptible to the influence of GDP or economic fluctuation. In particular, considering that annual net migration from East to West has averaged about 70,000 persons (or 0.5% of the population) per year and that the workforce of Eastern Germany shrank by roughly 1.2 million between 1991 and 2004, it is useful to measure government expenditure based on population size.

In addition, given that after reunification German real per capita GDP increased 1.1 percent per year during the period 1995-2006, analysis based on the ratio of government expenditures to GDP will likely exaggerate the increase in government expenditure after reunification compared to the pre-reunification period. Moreover, as each functional budget category has usually been measured by per capita spending, it is necessary to use the growth of government size measured by per capita expenditure for comparative analysis on both total and sub-policy spending.

All expenditure data listed in this study are nominal. Previous researchers have argued that real numbers should be used because public sector inflation is usually higher than an economy's overall inflation rate leading to an overestimation of public sector expenditures (Abizadeh and Yousefi1988). However, given the long time series of analysis and data availability, this study does not adjust for inflation. To begin with, finding an appropriate deflator is difficult at the state level in Germany. In addition, the fact that using non-adjusted values has not produced significant differences in empirical findings is considered. Garand (1988) concludes that using adjusted rather than non-adjusted values only partially affected his results; he was able to draw the same conclusions regardless of whether he used a deflated or un-deflated measurement of government growth. Moreover, it has been argued that non-adjusted values can reflect both changes in the real role of the government in the economy and changes in prices (Buchanan and Flowers 1980). Lewis-Beck and Rice (1985) also call for the use of non- adjusted values to obtain a clearer representation of the government's authority.

Based on these arguments, which have been presented in earlier public expenditure analyses, it does not appear that inflation adjustment would significantly alter the findings of this study, and thus non-adjusted values are used.

3.3.2. Independent Variables

Wagner's Law

Wagner's Law postulates that government growth is a function of several factors accompanying industrialization (Garand 1988). First, urbanization and increased population density resulting from industrialization give rise to changes in the role of government. These include greater involvement in providing public facilities and infrastructure, as well as increasing expenditures on

law and order. Moreover, an increase in the rate of economic growth facilitates the expansion of certain categories of income-elastic demand, such as demand for education, airports, mass transportation, etc (Buracom 2007).

Thus, the empirical model of Wagner's Law must include variables for economic development, urbanization, and population density. As the most consistently supported variable in past analyses, per capita income or per capita GDP is thought to be a primary indicator for measuring the degree of economic development. In addition, the population density is used as a measure of the urbanization. Therefore, this study employs per capita GDP and population density as indicators for measuring Wagner's Law.

The following model is suggested to capture the salient components of Wagner's Law:

$$\text{Government Expenditure} = a + b_1 (\text{Per Capita GDP}) + b_2 (\text{Population Density}) + e$$

Where 'Per Capita GDP' is the GDP of a country or state divided by the total number of people in that country or state and 'Population Density' is the population divided by the geographic area of the state or federal territory (in square miles). The coefficients of Per Capita GDP and Population Density should be positive and significant for Wagner's Law to have empirical support.

Age Composition

Government spending growth can be driven by increasing demand for public goods and services arising from demographic changes. Two population subgroups, school-age children under 18 and elderly people over 65, would fall into this demographic category. An increase in the proportion of young people in a total population may lead the government to spend more money on education (Kapeluck 2001). Similarly, an increase in the number of retirees may cause an expansion of public pension expenditures. Accordingly, the proportion of citizens over the age of

65 and under the age of 18 in the total population may be employed as independent variables to capture relationships between two demographic groups and government expenditure. An age composition hypothesis would suggest the following model:

$$\text{Government Expenditure} = a + b_1(\text{Population Under 18}) + b_2(\text{Population Over 65}) + e$$

Where 'Population Under 18' is the ratio of the number of citizens who are under 18 to a state's total population and 'Population Over 65' is the ratio of the number of citizens who are 65 or older to a state's total population. Theoretically, these variables are expected to have positive relationships with public spending.

Counter-Cyclical Policy

As discussed in the literature review, the counter-cyclical policy theory argues that recession and the unemployment rate are positively associated with the expansion of the public sector. In periods of economic downturn, the government is required to spend more to assist people who are hurt by economic hardship (Lewis-Beck and Rice 1985; Abrams 1999). The unemployment rate is defined as the number of unemployed as a percentage of the total labor force. The total labor force is defined as the economically active population. An economically active population is defined as the total number of persons between the ages 15 and 64 who are employed or were previously employed.

$$\text{Unemployement Rate} = \frac{\text{Number of persons Unemployed}}{\text{Toal population in Between 15 and 64}} \times 100$$

Therefore, the counter-cyclical policy theory is specified by the following model:

$$\text{Government Expenditure} = a + b_1(\text{Unemployment Rate}) + e$$

If the unemployment rate has a positive effect on government expenditure, the coefficient of the 'Unemployment Rate' variable should be positive and significant.

Openness of the Economy

The economic openness explanation posits that government expenditure is expected to increase due to greater demand for government transfers and redistributive programs as public insurance against external risk. In particular, the argument for a positive connection between openness and government size suggests that the *compensating effect,* in which economic openness incurs more spending on social protection (Gemmell et al. 2008), is larger than the *efficiency effect,* in which openness prevents the government from intervening the market (Garrett 1998).

Since Cameron's seminal analysis in 1978, many researchers have employed two indicators of economic openness, although empirical results have been inconsistent. Imports plus exports as a percentage of GDP is a common measure of the degree to which an economy is open. Another indicator is capital mobility and there are a variety of ways to measure this indicator based on the IMF codification system. In this study, the ratio of imports and exports to GDP will be used to measure economic openness and is denoted by:

$$\text{Openness} = \frac{\text{Import} + \text{Export}}{\text{Total GDP}} \times 100$$

The following specification of economic openness can be tested.

$$\text{Government Expenditure} = a + b_1 (\text{Openness of Economy}) + e$$

If the 'Openness of Economy' has a positive effect on government expenditure, the coefficient should be positive and significant.

Party Control

The party control hypothesis argues that the extent of government growth is determined by partisan control of government. When liberal parties dominate government, the theory predicts an

increasing socio-economic supply of public goods and services, such as health care and education, will bring about a corresponding increase in public expenditure. A conservative dominance, on the other hand, would be expected to result in either constant or declining government size.

In Germany, there are four major parties: The Christian Democratic Union (CDU), the Social Democratic Party (SPD), the Free Democratic Party (FDP), and the Green Party (GREEN). The SPD's core constituency includes union members and urban residents who prefer a higher degree of wealth redistribution and a larger public sector. Therefore, the SPD is regarded as a major party on the left. On the other hand, the CDU is supported by business-persons and rural residents who are responsive to the interests of the upper-middle class, and is categorized as a major party on the right. Two other much smaller parties – the Free Democratic Party (FDP) and the Green Party (GREEN) – have played important roles as coalition partners. The FDR's ideological position falls between the SPD and CDU on many cultural and social issues, and thus, this party has high coalition potential (Bawn 1999).

While the SPD has formed coalitions with all three other parties, the CDU has never formed a coalition with GREEN on a federal or state level (Potrafke 2007). The model used in this study categorizes SPD governments, SPD/FDP coalitions, and SPD/GREEN coalitions as 'left'. CDU governments and CDU/FDP coalitions are labeled 'right'. To test for the party control explanation, a dummy variable that distinguishes left (or progressive) and right (or conservative) parties is created.[19] Table 3-1 gives all the possible values for this variable. 'Grand coalitions' in which the SPD and the CDU join together are labeled 'left' when the SPD has the majority and 'right' when CDU has the majority. The following model is established for testing the party control explanation:

$$\text{Government Expenditure} = a + b_1 (\text{Right Party Control}) + e$$

[19] Incorporating the research design of Jochimsen and Nucsheler (2005).

Table 3.1. Dummy Variable for Party Control Explanation

Left	
SPD	= 0 for single-party Social Democratic governments
SPD/FDP	= 0 for SPD coalitions with Liberals
SPD/GREEN	= 0 for SPD coalitions with Greens
SPD/CDU	= 0 for Grand coalitions with SPD majority
Right	
CDU	= 1 for single-party Christian Democratic governments
CDU/FDP	= 1 for CDU coalitions with Liberals
SPD/CDU	= 1 for Grand coalitions with CDU majority

If the conservative party dominance has a negative relationship with an increase in government expenditure, the coefficient of 'Right Party Control' should be negative and significant.

Political Business Cycle

The political business cycle theory suggests that government expenditure increases in election years as the incumbent government tries to "buy votes" (Nordhaus 1975). In this view, governments and political parties in power use public spending as an instrument to manipulate political support in order to maximize their own chances of being re-elected.

Accordingly, governments often increase spending to stimulate economic growth and to reduce unemployment as elections approach in order to satisfy the voters and to gain an advantage at the polls. The theory assumes that expansionary monetary and fiscal policies will produce declines in the unemployment rate and inflationary consequences for the economy, and that myopic voters will respond by supporting the incumbent party with a favorable vote.

This study employs a dummy variable representing election year to test the political business cycle hypothesis; 'Election' is a dummy variable that takes the value of 1 in election years and zero in non-election years. The political business cycle theory is specified in the following model:

$$\text{Government Expenditure} = a + b_1 (\text{Election}) + e$$

To support the political business cycle hypothesis, the coefficient of 'Election' should be positive and significant.

Coalition Government

The coalition government hypothesis argues that the government in which different parties or authorities participate in the government's decision making process will increase spending. Accordingly, it is claimed that the more parties there are in government, the greater the propensity to increase spending, which seems to be in line with the idea that fiscal discipline suffers when political responsibility is shared (Roubini and Sachs 1989).

In parliamentary systems, where single parties rarely obtain a majority of seats in parliamentary elections, the effort to attain control of the executive branch necessitates the formation of a coalition of parties. In Germany's case it is very meaningful to examine the influence of coalition governments on government expenditure, as coalition governments have been formed for every year of the study period at the federal level and for over half of all years at the state level.

Following Roubini and Sachs's method (1989), this study constructs an index of 'Coalition Government' ranging from 0 (one-party government) to 1 (a coalition government with two or more partners) as seen Table 3-2; coalition governments with three partners were formed for only two years in one state (Brandenburg).

Table 3.2. Dummy Variable for Coalition Government Explanation

0	one-party majority parliamentary government
1	coalition parliamentary government with two or more coalition partners

The following model specifies the coalition government:

$$\text{Government Expenditure} = a + b_1 (\text{Coalition Government}) + e$$

To support the coalition government hypothesis, the coefficient of 'Coalition Government' should be positive and significant.

Bureau Voting

The bureau voting model suggests that as the proportion of bureaucrats in a population increases, their self-interested voting behavior will result in a larger public sector. Niskanen (1971) argues that public employees prefer larger budgets and exert greater influence on public spending than regular citizens because they are in a monopoly position over public production. As a result, it is expected that the more government employees there are in a population, the more the size of government will increase. The bureau voting explanation is tested using the following model:

$$\text{Government Expenditure} = a + b_1 (\text{Public Employees}) + e$$

Where the 'Public Employees' variable represents the ratio of public employees at the federal and state levels to the total population. If the bureau voting explanation is supported, the coefficient of 'Public Employees' should be positive and significant.

Fiscal Illusion

In the fiscal illusion theory, it is believed that government expenditure growth comes from an illusory effect in the fiscal system that makes it difficult for taxpayers to link the true costs of taxation to benefits of public goods (Downs 1957). The illusory effect relies on the invisibility of the fiscal system, which is attributed to three factors: taxation through withholding and indirect taxes; debt financing; and the complexity of the tax system.

It is very difficult to specify all the illusory aspects of the tax system in one simple but comprehensive model. Therefore, two proxies will be used to capture the invisibility of the tax

system. First, this study will employ the ratio of indirect tax to total tax revenues: the larger the ratio of indirect to total tax revenues, the greater the underestimation of the cost of public goods, which results in government spending growth. The other proxy is budget deficit as a percentage of total expenditure. This is utilized because debt financing, like indirect taxes, is also less visible to taxpayers. Debt financing shifts the tax burden to future taxpayers, and government expenditure increases when a greater share of revenue comes from debt financing. Given this, the following model of government expenditure is estimated:

$$\text{Government Expenditure} = a + b_1\,(\text{Indirect Tax Ratio}) + b_2\,(\text{Deficit Ratio}) + e$$

Where 'Indirect Tax Ratio' is the ratio of indirect taxation to total tax revenue, and 'Deficit Ratio' is the ratio of budget deficit to total expenditure. If fiscal illusion is a factor in government expenditure growth, then the coefficients of 'Indirect Tax Ratio' and 'Deficit Ratio' should both be positive and significant.

3.3.3. The Full Model of Government Expenditure Size and Composition

$$\text{Government Expenditure} = a + b_1\,(\text{Per Capita GDP}) + b_2\,(\text{Population Density}) + b_3\,(\text{Population Under 18}) + b_4\,(\text{Population Over 65}) + b_5\,(\text{Unemployment Rate}) + b_6\,(\text{Openness of Economy}) + b_7\,(\text{Right Party Control}) + b_8\,(\text{Election}) + b_9\,(\text{Coalition Government}) + b_{10}\,(\text{Public Employees}) + b_{11}\,(\text{Indirect Tax Ratio}) + b_{12}\,(\text{Deficit Ratio}) + b_{13}\,(\text{Government Level}) + e$$

The model contains a dummy variable, 'Government Level (b_{13})', distinguishing the level of government for panel in the data set. As opposed to other longitudinal studies that generally contain only panels at the same level of analysis (such as country or state), this study has chosen to include both federal government and state governments to capture the full spectrum of changes in the dynamics of German government expenditures. Therefore, the dummy variable is used to

control for inherent differences between the fiscal policies at each level.

A description of the variables introduced above and the expected signs of empirical tests are presented in Table 3-3, and statistics of variables are summarized in Table 3-4.

Table 3.3. Description of Independent Variables and Expected Signs of Empirical Test

Dependent Variable		**Description of Indicator**
Government Expenditure		Per capita total government expenditure
Social Welfare Expenditure		Per capita social welfare expenditure
Education Expenditure		Per capita education expenditure
Economic Services Expenditure		Per capita economic services expenditure
Health Expenditure		Per capita health expenditure
Public Safety Expenditure		Per capita public safety expenditure
Defense Expenditure		Per capita defense expenditure
Independent Variable and Expected Sign		**Description of Indicator**
Wagner's Law	(+) Per Capita GDP	Total GDP divided by the total population
	(+) Population Density	Total population divided by the number of square miles
Age Composition	(+) Population Under 18 (%)	Ratio of number of people under 18 to total population
	(+) Population Over 65 (%)	Ratio of number of people over 65 to total population
Counter-Cyclical Policy Theory	(+) Unemployment Rate (%)	Unemployment Rate
Openness of Economy	(+) Openness of Economy (%)	Ratio of the sum of export and import to GDP
Party Control	(+) Right Party Control	Dummy variable for left/right party
	Right Party Control CDU = 1 for single-party Christian Democratic governments CDU/FDP = 1 for CDU coalitions with Liberals Left Party Control SPD = 0 for single-party Social Democratic governments SPD/FDP = 0 for SPD coalitions with Liberals SPD/GREEN = 0 for SPD coalitions with Green	
Political Business Cycle	(+) Election	Dummy variable for election year
Coalition Government	(+) Coalition Government	Dummy Variable for Coalition Government 0: one-party majority parliamentary government 1: coalition parliamentary government with two or more coalition partners
Bureau Voting	(+) Public Employees (%)	Ratio of number of government employee to total population
Fiscal Illusion	(+) Indirect Tax Ratio (%)	Ratio of indirect taxation to total tax revenue
	(+) Deficit Ratio (%)	Ratio of budget deficit to total expenditure

Table 3.4. Descriptive Statistics of Independent Variables

Independent Variable	Mean	Std. Dev.	Min	Max
Per Capita GDP	18817.65	8160.928	2573.12	47412.41
Population Density	672.4506	905.1463	73.65254	3896.179
Population Under 18	21.00529	3.340806	14.62562	29.76187
Population Over 65	16.30839	2.128325	11.2946	23.10488
Unemployment Rate	9.528463	5.064348	0.5	21.7
Openness of Economy	0.4370266	0.1995249	0.0740848	1.015333
Right Party Control	0.4828283	0.5002106	0	1
Election	0.2424242	0.4289831	0	1
Coalition Government	0.4929293	0.5084812	0	2
Public Employees	3.209909	1.919954	0.4303192	9.843701
Indirect Tax Ratio	48.30073	10.32684	32.84185	78.18947
Deficit Ratio	1.632746	8.131465	-46.91477	24.47289

Chapter 4

Empirical Findings of Changes in German Government Expenditure

This chapter presents the empirical findings of the dynamics of the size, composition, and fiscal authority in German government expenditure before and after reunification**.** The first part of the chapter examines the significant increase in total and sub-policy spending that occurred after German reunification. To develop a complete understanding of this pattern, two aspects of expenditure are investigated: the general trend for the whole period, including a specific comparison of the time periods before and after reunification; and the existence of the displacement effect after reunification.

Next, given the observed changes in the composition of sub-policy spending categories before and after reunification, this chapter also presents the factors that affect both total spending and every one of major functions of government expenditure. In particular, it compares the impact of major determinants before and after reunification.

Lastly, this chapter identifies changes in fiscal authority after reunification.

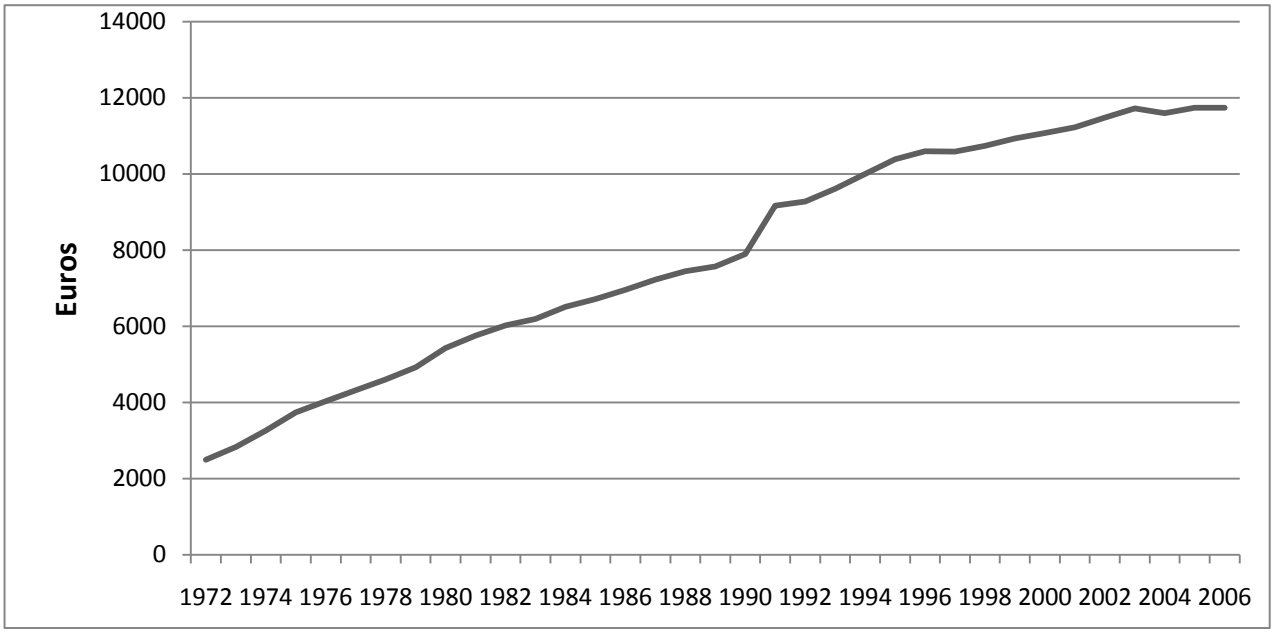
4.1. Overall Pattern of Government Expenditure and the Displacement Effect

Before considering the results of empirical tests for the displacement effect, a pattern of increased spending following reunification can be observed by looking at a graph and table of per capita total government expenditures. There are also noticeable increases in spending within most of the major sub-policy categories.

4.1.1. General Patterns of Government Expenditure

Total Expenditure

Figure 4.1. Historical Pattern of Per Capita Total Spending

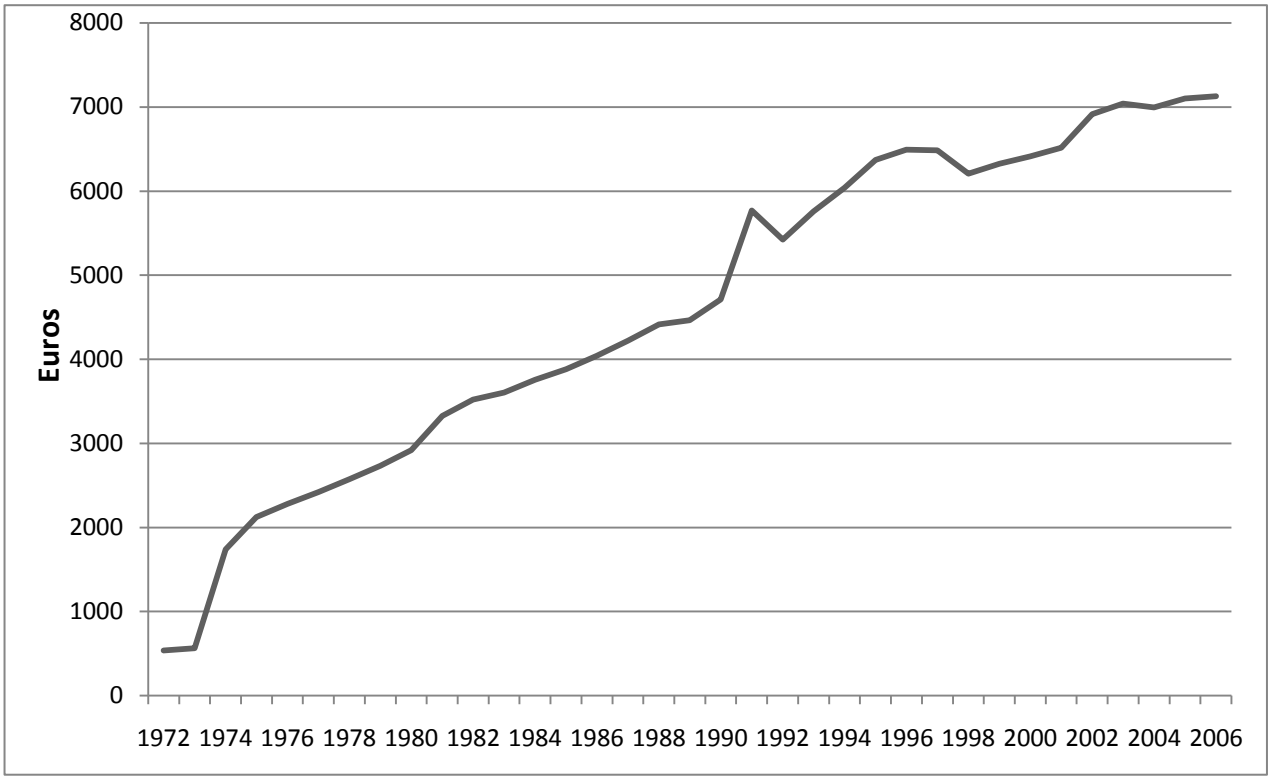


The per capita total government expenditures in Germany display a stepwise growth pattern. As seen in Figure 4-1, there is a noticeable spike in per capita spending from 1990-1991. Total spending then flattens out somewhat, but continues to increase immediately following reunification. The accompanying statistics in Table 4-1 confirm that the average per capita expenditure for the years after reunification (1991-2006) is nearly double the average during the period before reunification (1972-1990).

Table 4.1. Total Spending Before and After Reunification

	Before Reunification			After Reunification		
	1972-1980	**1981-1985**	**1986-1990**	**1991-1995**	**1996-2000**	**2001-2006**
Total spending (Euros)	3961.555	6240.228	7419.403	9690.0128	10786.732	11583.069
Average	5471.166			10742.634		

Figure 4.2. Historical Pattern of Per Capita Social Security Spending



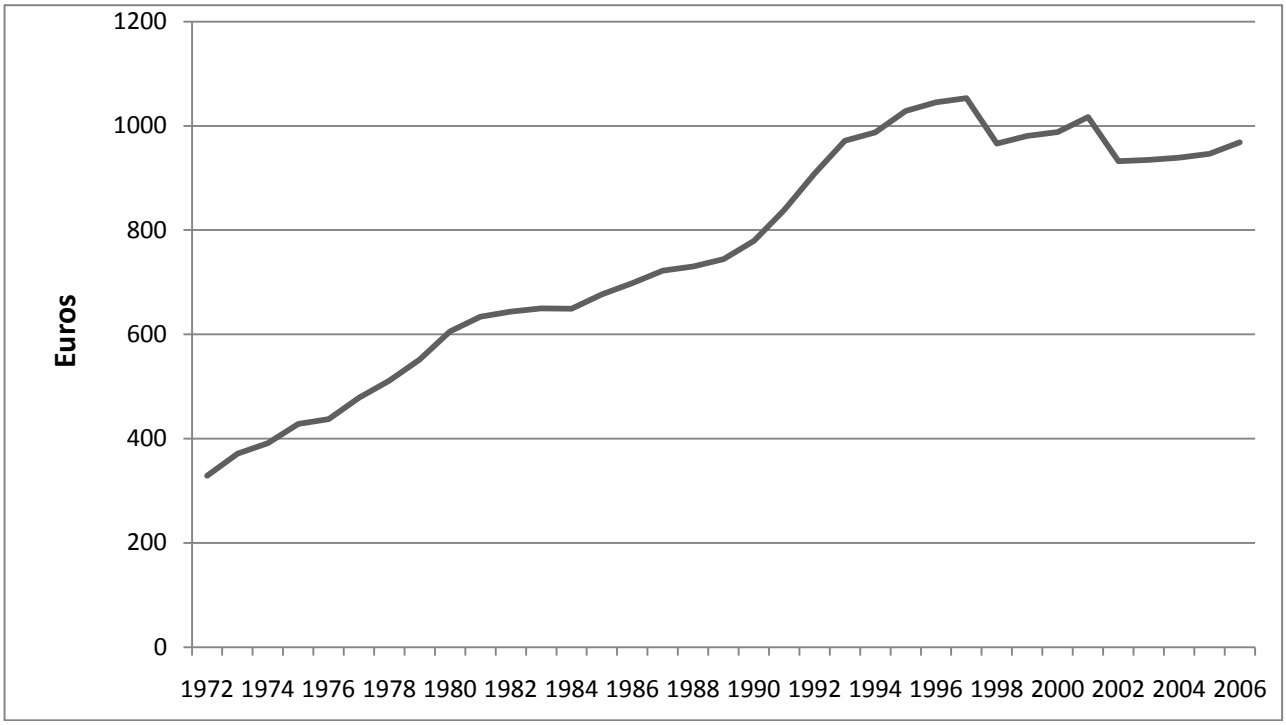
Social Security Expenditure

Social security expenditure also shows a substantial upward trend. As shown in Figure 4-2, a major spike occurs immediately after reunification, especially between 1990 and 1992. The averages presented in Table 4-2 also indicate that per capita social security spending increases significantly after reunification. The annual average per capita social security expenditure increases from 3044 Euros before reunification to 6436 euros after reunification.

Table 4.2. Social Security Spending Before and After Reunification

	Before Reunification			After Reunification		
	1972-1980	**1981-1985**	**1986-1990**	**1991-1995**	**1996-2000**	**2001-2006**
Social Security spending (Euros)	1988.424	3618.508	4372.186	5872.366	6385.061	6949.648
Average	3044.699			6436.565		

Figure 4.3. Historical Pattern of Per Capita Education Spending



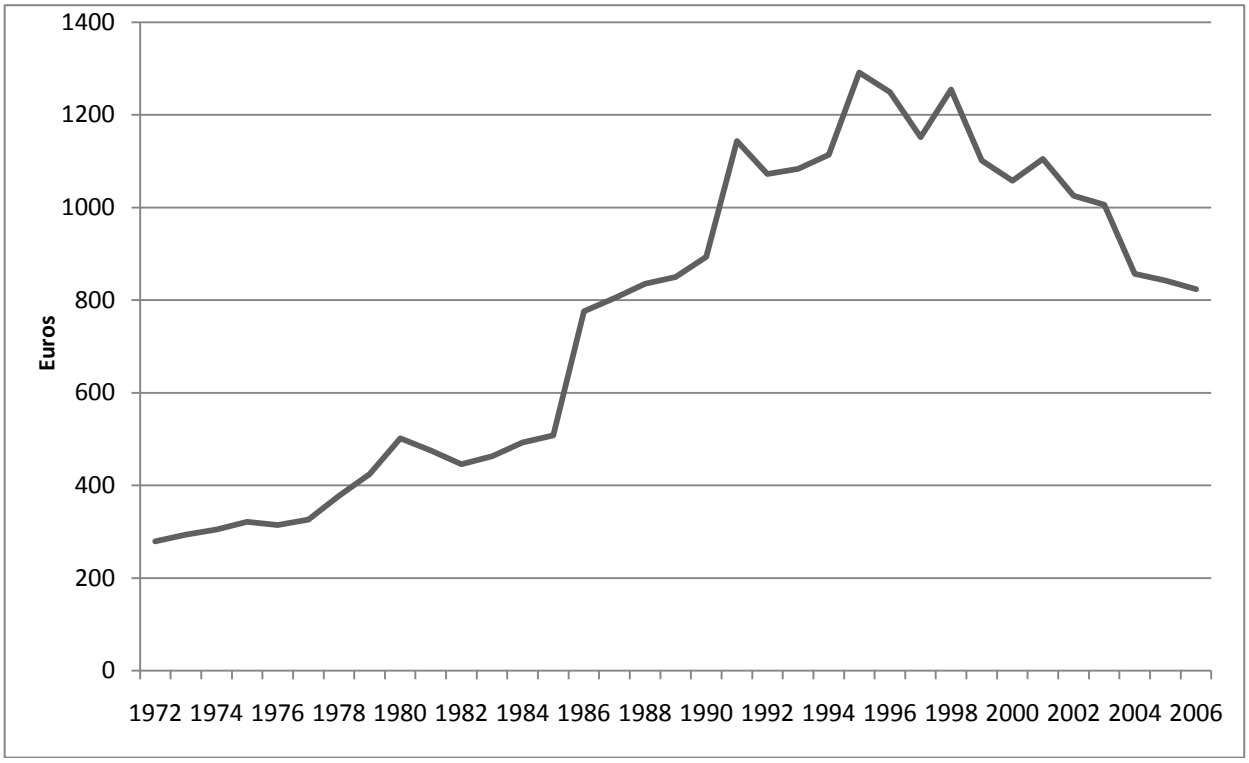
Education Expenditure

It is clear from Figure 4-3 that per capita education expenditure increases in a stepwise pattern after reunification. While education spending appears to increase substantially after 1972, the line becomes much steeper following reunification. However, after peaking in 1997, spending flattens out and begins to decline slightly.

Table 4.3. Education Spending Before and After Reunification

	Before Reunification			After Reunification		
	1972-1980	**1981-1985**	**1986-1990**	**1991-1995**	**1996-2000**	**2001-2006**
Education spending (Euros)	456.029	650.724	735.103	946.974	1006.820	956.218
Average	580.705			969.142		

Figure 4.4. Historical Pattern of Per Capita Economic Service Spending



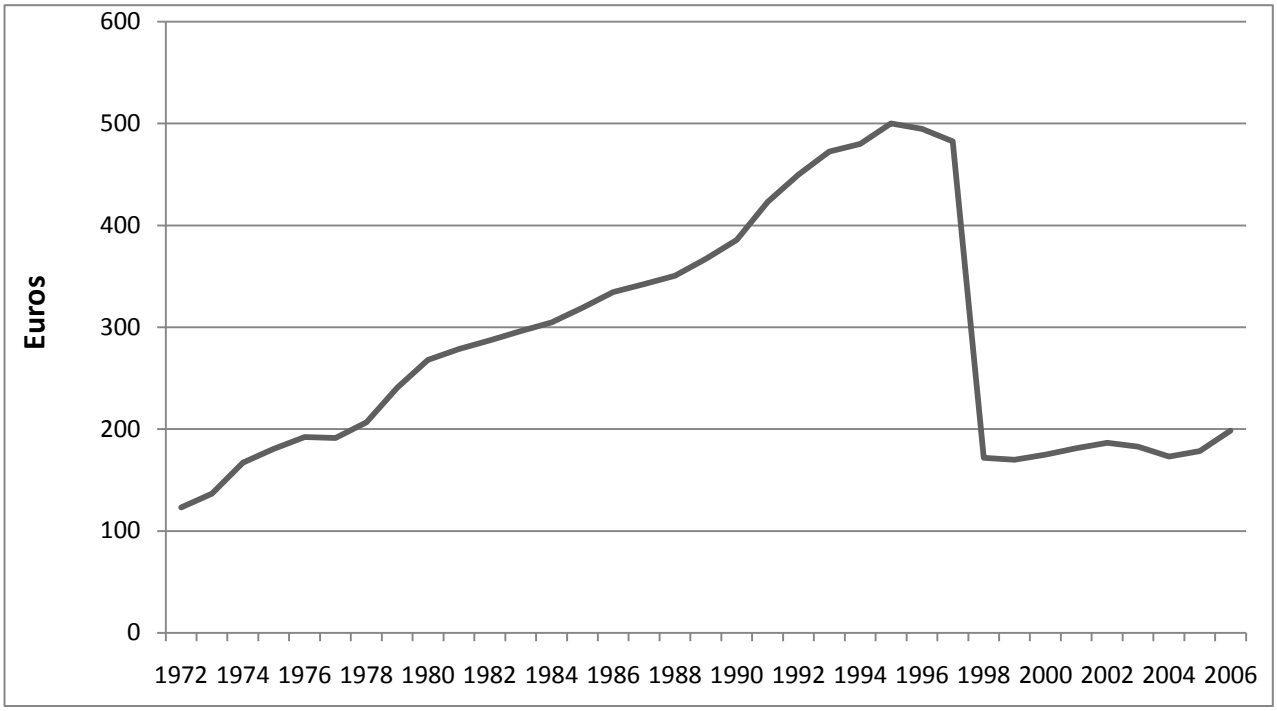
Economic Service Expenditure

As seen in Figure 4-4, per capita spending on economic service follows an increasing trend from 1972 to 1995, with a noticeable spike in 1991. After reunification, per capita expenditure appears to increase substantially until around 1995, when a small but steady decline begins that lasts over the next decade.

Table 4.4. Economic Services Spending Before and After Reunification

	Before Reunification			After Reunification		
	1972-1980	**1981-1985**	**1986-1990**	**1991-1995**	**1996-2000**	**2001-2006**
Economic Service spending (Euros)	349.342	477.174	831.807	1140.944	1162.859	943.152
Average	509.947			969.142		

Figure 4.5. Historical Pattern of Per Capita Health Spending



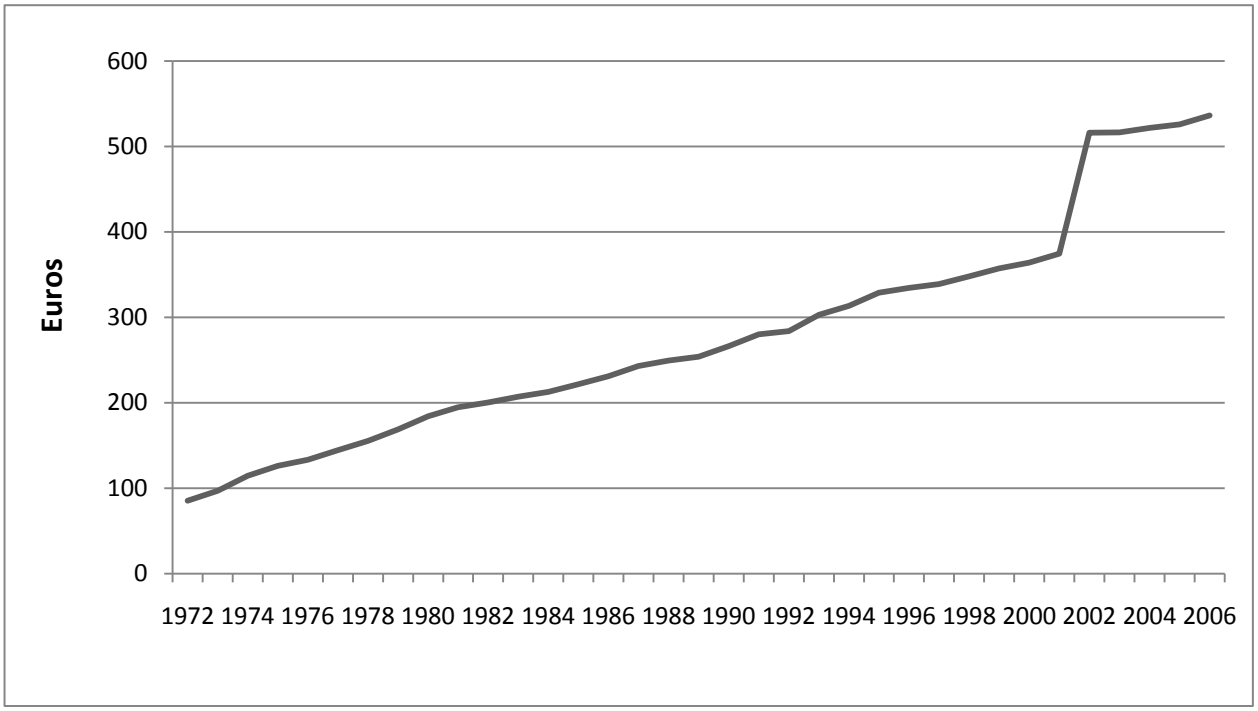
Health Expenditure

Per capita health expenditure exhibits a skewed bell-shape trend. Figure 4-5 shows that average health expenditures increase steadily from 1972 to 1996, with a slightly steeper slope after reunification. However, neither the graph nor associated statistics demonstrate a great distinction in the spending trends before and after reunification. The precipitous drop in health spending in 1997 is due to a change in the German health care system. The reform includes the implementation of co-payments, user fees, and rationalization of benefits coupled with cuts of government support.

Table 4.5. Health Spending Before and After Reunification

	Before Reunification			After Reunification		
	1972-1980	**1981-1985**	**1986-1990**	**1991-1995**	**1996-2000**	**2001-2006**
Health spending (Euros)	189.555	297.098	356.127	465.103	298.729	183.429
Average	261.690			307.483		

Figure 4.6. Historical Pattern of Per Capita Public Safety Spending



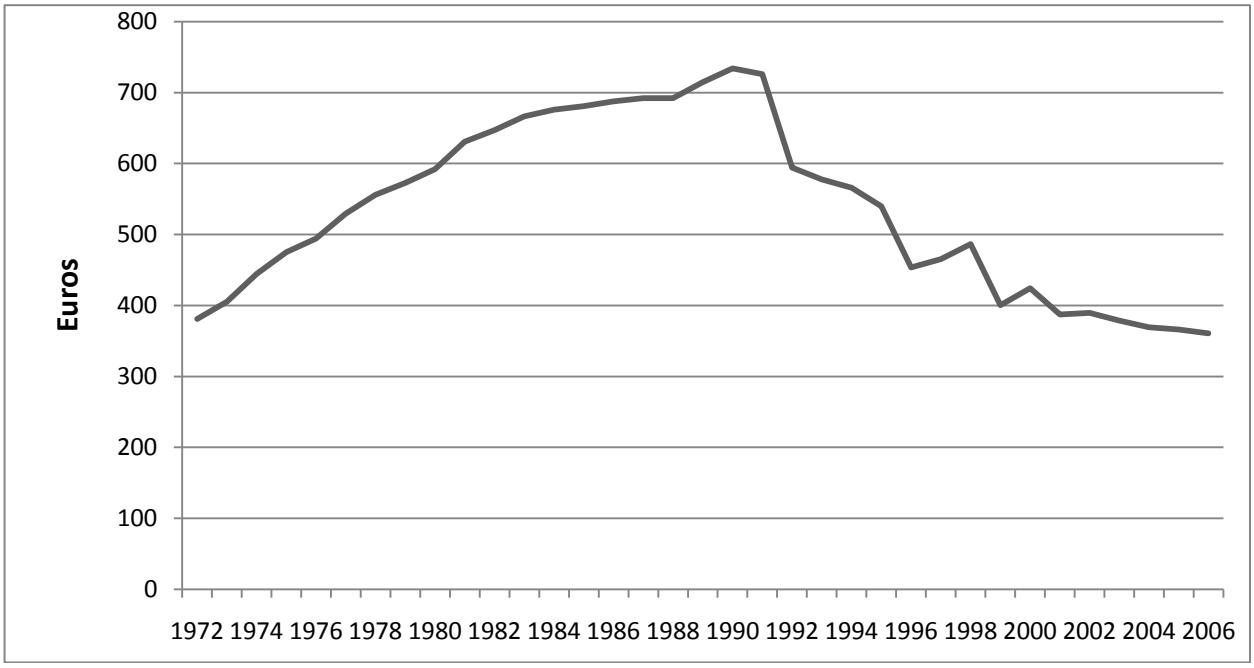
Public Safety Expenditure

Figure 4-6 reveals an upward trend in per capita public safety spending following reunification. The annual average per capita public safety expenditure increases from 183.33 Euros before reunification to 390.31 Euros after reunification, more than doubling. However, there does not appear to be a particularly steep increase immediately following reunification; instead expenditures seem to follow a steadily increasing trend.

Table 4.6. Public Safety Spending Before and After Reunification

	Before Reunification			After Reunification		
	1972-1980	**1981-1985**	**1986-1990**	**1991-1995**	**1996-2000**	**2001-2006**
Public Safety spending (Euros)	134.573	207.521	248.813	301.963	348.646	498.643
Average	183.833			390.306		

Figure 4.7. Historical Pattern of Per Capita Defense Spending



Defense Expenditure

Per capita defense spending follows a bell-shaped pattern, as shown in Figure 4-7. The rate of increase in spending slows during the period before reunification until it eventually flattens out by 1990. During the reunification year there is a small but sharp increase; however, spending then decreases for the entire post-reunification period (1991-2006). The steepest drop comes in the years just after reunification, followed by continuous progressive decline.

Table 4.7. Defense Spending Before and After Reunification

	Before Reunification			After Reunification		
	1972-1980	**1981-1985**	**1986-1990**	**1991-1995**	**1996-2000**	**2001-2006**
Defense spending (Euros)	494.431	660.276	704.144	600.695	446.108	375.234
Average	593.262			467.839		

4.1.2. Existence of the Displacement Effect

As discussed in the methodology section of Chapter 3, this study first calculates the modified Wald statistic for possible time-points to determine the timing of structural change. As seen in Table 4-8, this study detects a candidate for the location of the change-point at 1990, which yields by far the maximum value of the modified Wald statistic and is significant at the 1% level. This result validates the *a priori* selection of the year of reunification as a breakpoint. Additional tests for evidence of the displacement effect can now be performed.

Table 4.8. Search For Structural Change-Points for Germany

Time	N_1	Mod. Wald
1975	4	330.68***
1980	9	786.73***
1985	14	936.84***
1990	**19**	**10367.66*** **
1995	24	455.08***
2000	29	1156.95***
2001	30	1730.52***

Note: ***p<0.01, **p<0.05, *p<0.10

To test empirically for a structural change, this study has estimated models for three time periods: 1972-2006 (the entire study period), 1972-1990 (before reunification), and 1991-2006 (after reunification). The Chow test statistic shown in Table 4-9 is evidence of a structural break between the two time periods. Thus, the null hypothesis that the coefficients from each model are equal can be rejected. However, as discussed in the methodology section, the results of the Chow test do not indicate the direction of the displacement –only that the estimated model parameters are significantly different. Therefore, examination of the changes in coefficients is necessary. The increase in the intercept term suggests that upward displacement has taken place; however, some of the slope coefficients do not move in the expected direction. Furthermore, several of the variables

do not exhibit consistent trends throughout the entire period so it is difficult to interpret the change in coefficients across sub-periods.

Table 4.9. Chow Test for Structural Break

Variables	Overall Period (1972-2006)	Before Unification (1972-1990)	After Unification (1990-2006)
Reunification	517.2066 ***		
Constant	3950.9050 ***	2450.1470 ***	6802.1740 ***
Socio-Economic Variables			
- Per Capita GDP	0.04225 ***	0.0633	0.0412 ***
- Population Density	0.2791 ***	-0.2347	0.3226 ***
- Population Under 18 (%)	-31.2234	-17.7219	-66.2934 **
- Population Over 65 (%)	-5.5735	-3.0734	-57.7507 ***
- Unemployment Rate (%)	108.9620 ***	73.2424 ***	151.3824 ***
- Openness of Economy (%)	526.2962 ***	601.7268 ***	1144.7230 ***
Political Variables			
- Right Party Control	183.3344 **	281.7449 ***	2.7205
- Election	33.3497	54.4279	39.4535
- Coalition Government	109.6337 **	73.3055	182.61230 ***
Institutional Variables			
- Public Employees (%)	328.3056 ***	473.8423 ***	252.1544 ***
- Indirect Tax Ratio (%)	-0.02324	-1.1247	-1.5111
- Deficit Ratio (%)	9.1598 **	-4.0543	15.22733 ***
F_0	1426.28	8338.49	2628.39
Prob > F	<0.0<0.0001	<0.0<0.0001	<0.0<0.0001
R-squared	0.9058	0.9338	0.9611

Period	T_{break}	Chow (2,31)	Modified Wald
1972-2006	1990	19.257 ***	

Note: ***p<0.01, **p<0.05, *p<0.10

Since the change in slope coefficients is ambiguous, the study also confirms upward displacement by testing the intercept shift with a time dummy variable. Model parameters are estimated for the entire period without a dummy variable to control for reunification, and the model is then re-estimated with the inclusion of a time dummy variable set equal to 1 for the period after

reunification. As Table 4-10 indicates, the intercept shifts from 2659.841 to 3950.905, supporting the hypothesis that the direction of displacement is indeed upward. Additionally, the slope coefficient on the reunification variable is large, positive, and statistically significant at the 5% level, indicating that it is an important determinant in explaining the trend of increased government spending over time.

Table 4.10. Time Dummy Variable Intercept Shift

Variables	Overall Period (1972-2006) without dummy		Overall Period (1972-2006) with dummy	
Reunification			517.2066	***
Constant	2659.8410	***	3950.9050	***
Socio-Economic Variables				
- Per Capita GDP	0.0686	***	0.04225	***
- Population Density	0.2547	***	0.27915	***
- Population Under 18 (%)	-0.9060		-31.22347	
- Population Over 65 (%)	28.4784		-5.57352	
- Unemployment Rate (%)	133.4160	***	108.962	***
- Openness of Economy (%)	74.8560		526.2962	***
Political Variables				
- Right Party Control	150.5828	*	183.3344	**
- Election	11.6243		33.3497	
- Coalition Government	114.8309	**	109.6337	**
Institutional Variables				
- Public Employees (%)	316.4504	***	328.3056	***
- Indirect Tax Ratio (%)	-2.0569		-0.0232	
- Deficit Ratio (%)	10.1126	**	9.1598	**
F_0	1426.28		1426.28	
Prob > F	<0.0001		<0.0001	
R-squared	0.9058		0.9058	

Note: ***p<0.01, **p<0.05, *p<0.10

The Tussing and Henning's (1991) approach of using each model (before and after) to forecast values for the contiguous period offers additional support for the existence of an upward

displacement effect. The early period regression was used to forecast values for the later period; then the actual later period values for total expenditures were regressed on the predicted values. The results are presented in Table 4-11. The equation can be interpreted to mean that in order to obtain the estimated actual values of the dependent variable; the forecasted value must be multiplied by 1.40934, or increased by 40.934%. Since the early structure under-predicts expenditures after reunification, there is evidence of upward displacement. The reverse result also supports the existence of an upward displacement effect; when the post-reunification period regression is used to predict the pre-reunification values and the actual values are regressed on the forecast values, the later-period regression over-predicts pre-unification total expenditure per capita. The results are presented on the second line in the Table 4-11. In order to obtain the estimated actual values of the dependent variable, the forecasted value must be multiplied by 0.60816, or reduced by 39.184%.

Table 4.11. Actual Post-Reunification Expenditures vs. Pre-Reunification Regression

Period Forecasted	From Regression	Constant Term	Slope Term	F_0	R^2
1991-2006	1972-1990	-767.3730***	1.4093***	354.04	0.7482
1972-1990	1991-2006	741.1968***	0.6081***	282.09	0.7263

Note: ***p<0.01, **p<0.05, *p<0.10

The Gupta approach is the final measure used to test for evidence of a displacement effect. As seen in Table 4-12, the slope regression coefficient estimates the GDP elasticity of government expenditure. The slope is greatest during the period from 1991 to 1995 immediately following the social disturbance. This suggests that demand for expenditures increased significantly following reunification and that the government spending pattern changed such that expenditures were inclined to increase significantly more relative to GDP. After 1995, the slope coefficient returns to a level closer to the pre-reunification period, although the coefficient is not statistically significant.

Table 4.12. GDP Elasticity for Full Period and Sub-Periods

Period	Slope	Adj R^2
1972-2006	0.27091 ***	0.9978
	(.074176)	
1972-1990	0.20134 **	0.9971
	(.08840)	
1991-1995	**0.57884 ****	0.9777
	(.08753)	
1996-2006	0.19123	0.9387
	(.20642)	

Note: ***p<0.01, **p<0.05, *p<0.10

As discussed in the methodology section, this study also examines the revenue component of the displacement effect. As seen in Table 4-13, the increase in the slope coefficient of TAXFIN across sub-periods indicates that the tolerable level of taxation increased and was maintained after reunification. The negative slope coefficient of the period before reunification suggests that taxpayers were not willing to finance additional government expenditure via taxes (Legrenzi 2004).

After reunification, however, the slope coefficient increases considerably, although it remains negative, indicating that taxpayers demanded more public expenditures and were willing to finance spending through higher taxes (Legrenzi 2004).

Additionally, the slope coefficient value is greatest during the sub-period immediately following reunification; though this value does not decrease to the pre-reunification level after 1995, supporting Peacock and Wiseman's notion that acceptance of higher taxes should remain once the disturbance has disappeared.

Table 4.13. Regression Analysis for Full Period and Sub-periods

Period	Slope	F_0
1972-2006	-0.47905**	6.82**
1972-1990	-1.05843***	255.94***
1991-2006	-0.44041***	18.39***
1991-1995	-0.59262***	268.82***
1996-2006	-0.74166***	35.94***

Note: ***p<0.01, **p<0.05, *p<0.10

4.2. Determinants of Total Expenditure and Functional Budget Categories

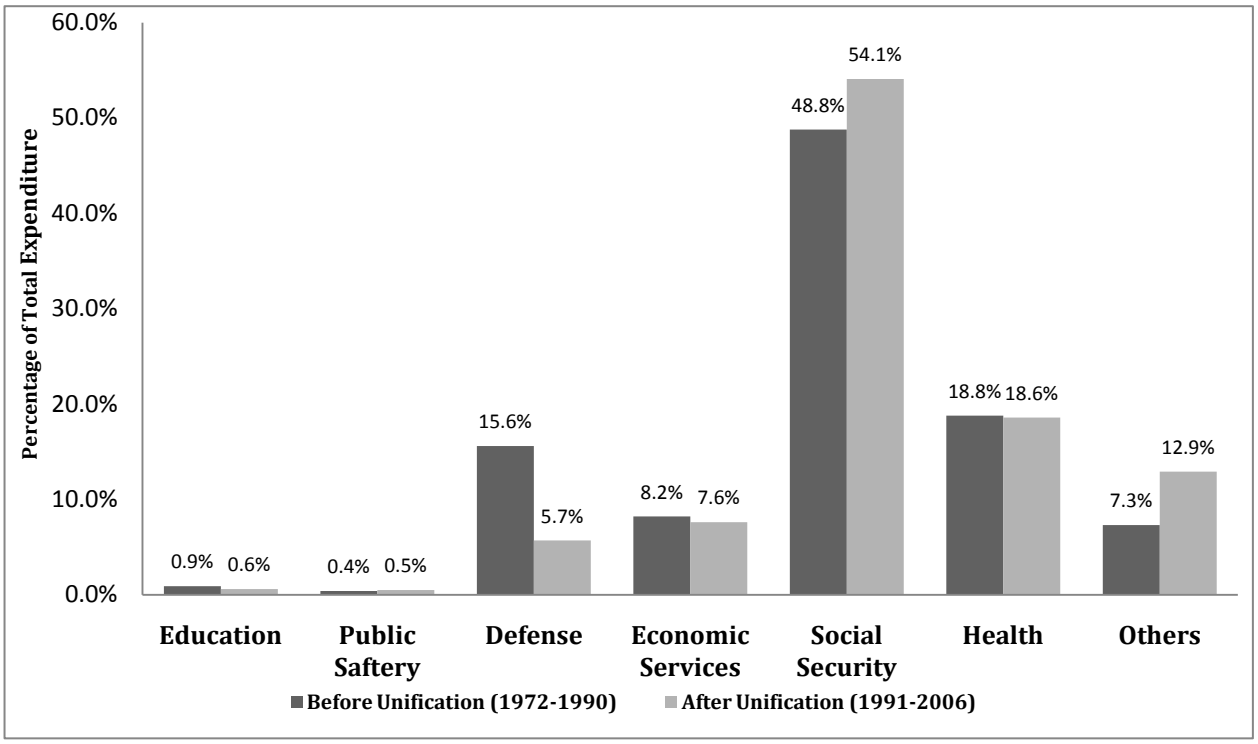
This section examines the determinants of both the aggregate size of public spending and of spending in six sub-policy categories. In particular, it focuses on the question of what factors influence changes in government expenditure and how these factors relate to total spending and sub-policy spending categories before and after reunification.

The change in composition of federal and state government expenditure will be explained first, followed by an explanation of the determinants of total spending and spending in major sub-policy categories. Empirical results using the Driscoll/Kraay method are presented in this section (for purposes of comparison, empirical results using the PCSE method are attached in the Appendix). A more detailed and sophisticated account of the influence of each determinant on change in government expenditure and fiscal implications will be discussed in Chapter 5.

4.2.1. Change in the Composition of Federal and State Government Expenditure

In addition to increases in expenditure size, German reunification also changed the composition of government spending at the federal level; changes in social security and defense spending are particularly noteworthy. The percent of federal spending on Social security increases almost six percent after reunification, swelling to over half of total expenditure. This trend coincides with the policies enforced by the Kohl government: West Germany transferred huge amounts of money to the East after reunification, mainly to support social security programs.

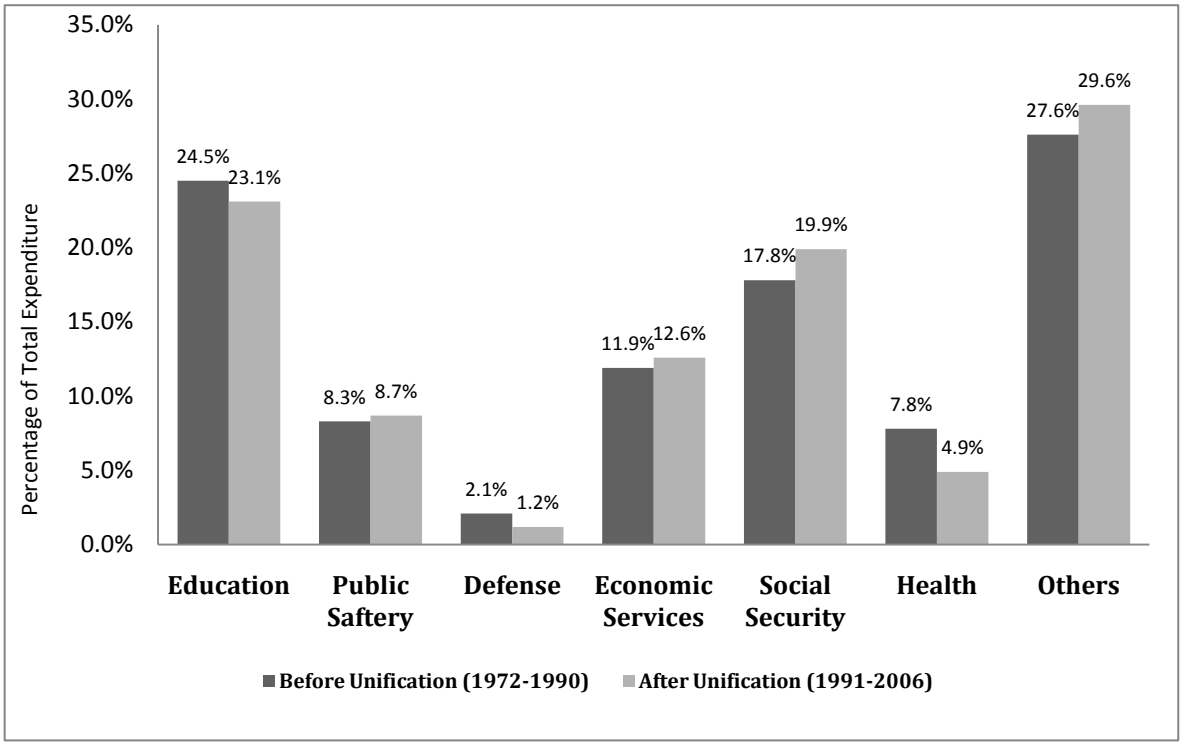
Figure 4.8. Change in the Composition of Federal Spending



On the other hand, as the enmity between the two countries disappeared and the Cold War came to an end, defense expenditure shows an opposite trend, dropping by10% and representing only 5.7% of total spending after reunification. Economic service spending, which accounts for less 10% of total spending, diminishes by 0.6% after reunification. Spending on education, public safety, and health change only slightly after 1990.

The composition of states government expenditure is somewhat different before and after reunification, with each sub-policy area varying to a certain extent. Education, the largest category of expenditure for local governments decreases from 24.5% to 23.1% of total spending. The proportion of social security spending by local governments increases the most (2.1%) and amounts to almost 20% of total expenditure after the reunification. Health expenditure also decreases by approximately 3%, and the percent of defense spending is nearly cut in half. On the other hand, spending on economic services and public safety shows signs of increasing as a portion of total spending after reunification.

Figure 4.9. Change in Composition of State Spending



4.2.2. Empirical Results on Determinants of Total and Sub-Policy Spending

Determinants of Total Spending

Table 4.14. Determinants of Per Capita Total Spending

Variables	Overall (1972-2006)		Before Reunification (1972-1990)		After Reunification (1991-2006)	
Reunification	517.2066	***				
Constant	3950.905	***	2450.147		6802.174	***
Socio-Economic Variables						
Per Capita GDP	0.04225	***	0.06334	***	0.04129	***
Population Density	0.27915	***	-0.23478		0.32267	***
Population under 18 (%)	-31.22347		-17.7219		-66.29343	**
Population over 65 (%)	-5.57352		-3.07344		-57.75075	***
Unemployment Rate (%)	108.962	***	73.24243	***	151.3824	***
Openness of Economy (%)	526.2962	***	601.7268	***	1144.723	***
Political Variables						
Right Party Control	183.3344	**	281.7449	***	2.72053	
Election	33.34977		54.42797		39.45354	
Coalition Government	109.6337	**	73.30558		182.6123	***
Institutional Variables						
Public Employees (%)	328.3056	***	473.8423	***	252.1544	***
Indirect Tax Ratio (%)	-0.02324		-1.12478		-1.51116	
Deficit Ratio (%)	9.1598	**	-4.05433		15.22733	***
F-value	1426.28		8338.49		2628.39	
Prob > F	0		0		0	
R-squared	0.9058		0.9338		0.9611	

Note: ***p<0.01, **p<0.05, *p<0.10

As shown in Table 4-14, the reunification has a strong and positive impact on per capita total spending (β= 517.20, p<.000). This suggests that the higher level of per capita total spending is partially a result of German reunification.

Statistical analysis reveals that the association between many determinants and per capita total spending generally meets this study's theoretical expectations. In particular, socio-economic and institutional factors show strong theoretical relationships after reunification. The variable 'per capita

GDP' has strong positive and significant associations with total spending throughout every period of interest ($\beta_{overall}$=0.0422, p<.000; β_{before}=0.0633, p<.008; β_{after}=0.0412, p<.000). However, one interesting finding is that the 'age composition' factor, including the proportions of young and elderly people in the population, has a significant but negative impact on total spending after reunification (for the young β_{after}=-66.29, p<.017; for the elderly β_{after}= -57.75, p<.002). These factors are not significantly associated with total spending in the period before reunification.

The 'unemployment rate' variable also has strong and positive impacts on total spending throughout each period. Notably, the value of the coefficient is greater after reunification ($\beta_{overall}$= 108.96, p<.000; β_{before}= 73.24, p<.000; β_{after}= 151.38, p<.000). Likewise, the 'openness of economy' variable has a strong and positive association with total spending, and the relationship becomes stronger after reunification ($\beta_{overall}$= 526.29, p<.008; β_{before}=601.72, p<.003; β_{after}=1144.72, p<.000). The 'population density' variable is found to be positively associated with total spending in the overall and after-reunification periods ($\beta_{overall}$=0.2791, p<.001; β_{after}= 0.3226, p<.000), but before reunification, the relationship is negative and not statistically significant (β_{before}= -0.2347, p<.129).

Somewhat surprisingly, the analysis reveals that the 'right party control' variable has a positive influence on total spending before reunification (β_{before}=281.74, p<.000), but its effect is not significant after reunification (β_{after}=2.72, p<.955). Additionally, in contrast to theoretical predictions, the results reveals that elections do not have any significant effect on total spending; although the signs of the coefficients agree with expectations ($\beta_{overall}$=33.34, p<.504; β_{before}=54.42, p<.288; β_{after}=39.45, p<.358). Consistent with expectations though, the 'coalition government' variable has a strong and positive influence on total spending after reunification (β_{after}=182.61, p<.002). The impact of this explanatory variable is much stronger after reunification as compared to before reunification where there is no significant relationship (β_{before}=73.30, p<.327).

The 'public employees' variable also shows strong and positive associations with total spending throughout every period ($\beta_{overall}$=328.30, p<.000; β_{before}=473.84, p<.000; β_{after}=252.15, p<.000). The 'indirect tax ratio' variable is not statistically associated with total spending in any of the periods; in contrast, the 'deficit ratio' has a positive influence on total spending as expected, especially after reunification ($\beta_{overall}$=9.15, p<.032; β_{after}=15.22, p<.003).

Determinants of Social Security Spending

Table 4.15. Determinants of Per Capita Social Security Spending

Variables	Overall (1972-2006)		Before Reunification (1972-1990)		After Reunification (1991-2006)	
Reunification	344.6081	***				
Constant	4596.338	***	3201.436	***	3450.094	***
Socio-Economic Variables						
Per Capita GDP	0.00617	*	0.00891		0.01608	***
Population Density	0.09764	***	0.12009		0.17167	***
Population under 18 (%)	-46.81096	***	-35.0443	**	32.35299	***
Population over 65 (%)	-4.15988		-12.96326		65.13138	***
Unemployment Rate (%)	0.52138		13.2683	**	15.25163	***
Openness of Economy (%)	203.1751	**	-18.67658		-209.3046	**
Political Variables						
Right Party Control	66.82223		190.6156	***	-134.3414	***
Election	-0.83369		-5.1697		21.25253	*
Coalition Government	-17.87603		33.85956		20.93937	
Institutional Variables						
Public Employees (%)	34.81881	***	24.68536	*	33.27761	**
Indirect Tax Ratio (%)	-2.09113		-0.82415		-2.999	***
Deficit Ratio (%)	7.50866	**	6.22562		1.60094	
F-value	438.9		7704.38		31279.75	
Prob > F	0		0		0	
R-squared	0.8432		0.8575		0.9882	

Note: ***p<0.01, **p<0.05, *p<0.10

The results indicate that the reunification has a strong and positive effect on social security spending and significant with a coefficient of 344.60 ($p<.000$). As seen in Table 4-15, many of the determinants appear to have positive influences on per capita social security spending.

First, 'per capita GDP' has the expected significant relationships to social security spending in the overall and after-reunification periods, but its impact is not significant before reunification ($\beta_{overall}=0.0061$, $p<.076$; $\beta_{after}=.0160$, $p<.000$). 'Population density' also has a noticeable effect on social security spending after reunification ($\beta_{after}=0.1716$, $p<.000$), while its impact is not statistically significant before reunification ($\beta_{before}=0.0089$, $p<.154$). The effects of 'age composition' factor (the proportions of young and elderly people in the population) are consistent with theoretical expectations after reunification (for the young $\beta_{after}= 32.35$, $p<.004$; for the elderly $\beta_{after}=65.13$, $p<.000$). For the other periods of interest, the coefficients of these variables have either unexpected signs or are not significant. The 'unemployment rate' variable is generally consistent with theoretical expectations. Specifically, its coefficient value is larger after reunification ($\beta_{before}=13.26$, $p<.015$; $\beta_{after}=15.25$, $p<.000$). However, the 'openness of economy' variable has a negative influence on social security spending after reunification, although its effect is not significant before reunification ($\beta_{before}=-18.67$, $p<.854$; $\beta_{after}=-209.30$, $p<.017$).

The statistical analysis regarding the political variables reveals that 'right party control' has a negative relationship with social security spending after reunification, in line with theoretical expectations ($\beta_{after}=-134.34$, $p<.000$). The effect of the 'election' variable on social security spending also satisfies theoretical assumptions, but only after reunification ($\beta_{after}=21.25$, $p<.098$). It is also interesting that the coefficient values are negative and not significant for the overall and before-reunification periods. Surprisingly, the 'coalition government' variable does not have any significant effect on social security spending.

The empirical findings regarding institutional variables reveal that only the 'public employees' variable meets the study's theoretical assumptions throughout each period under investigation ($\beta_{overall}$=34.81, p<.001; β_{before}=24.68, p<.091; β_{after}=33.27, p<.010). The coefficient values for the 'indirect tax ratio' variable are not significant in overall and before-reunification periods; the negative coefficient value after reunification is highly significant (β_{after}=-2.99, p<.000). The 'deficit ratio' variable is only significant in the overall period ($\beta_{overall}$=7.50, p<.016); for the other periods it does not have a significant impact on social security spending.

Determinants of Education Spending

Table 4.16. Determinants of Per Capita Education Spending

Variables	Overall (1972-2006)		Before Reunification (1972-1990)		After Reunification (1991-2006)	
Reunification	130.8564	***				
Constant	456.7512	***	102.0105		-604.6861	***
Socio-Economic Variables						
Per Capita GDP	0.01092	***	0.01113	*	0.01015	***
Population Density	-0.03383	***	-0.13509	***	0.01683	*
Population under 18 (%)	-12.80398	***	-10.58283		23.93978	***
Population over 65 (%)	-21.75448	***	-1.46367		-9.22535	**
Unemployment Rate (%)	13.08318	***	17.86128	***	15.0896	***
Openness of Economy (%)	-168.9543	***	-148.5924		-91.50895	
Political Variables						
Right Party Control	9.37334		-9.24926		26.19669	***
Election	10.68628		19.37746		-0.77116	
Coalition Government	2.39901		4.41898		-26.48382	***
Institutional Variables						
Public Employees (%)	52.81288	***	55.53822	***	32.49155	***
Indirect Tax Ratio (%)	-1.83733	**	0.73646		-.268943	
Deficit Ratio (%)	-0.41555		-3.56295	**	1.44478	
F-value	683.08		519.38		52628.96	
Prob > F	0		0		0	
R-squared	0.9088		0.9056		0.9138	

Note: ***p<0.01, **p<0.05, *p<0.10

The results show that the reunification variable is positively associated with the level of per capita education spending ($\beta = 130.85$, $p<.000$). The large coefficient value reveals that reunification is a strong indicator for the increase in education spending.

The empirical findings also show that socio-economic variables generally have significant impacts on the level of education spending.

The 'Per capita GDP' consistently shows a positive influence on education spending, confirming the theoretical expectations for this factor ($\beta_{overall}=0.0109$, $p<.000$; $\beta_{before}=0.0111$, $p<.050$; $\beta_{after}=0.0101$, $p<.000$). The effect of the 'population density' variable has a significant and positive effect on education spending only after reunification ($\beta_{after}=0.0168$, $p<.058$). The results regarding 'age composition' variable suggest that only the effect of the proportion of young people in the population after reunification meets theoretical expectations that the ratio of young people to the population has a positive relationship with education spending ($\beta_{after}=23.93$, $p<.001$). The impact of the 'unemployment rate' variable also shows a positive effect on education spending in any of the periods ($\beta_{overall}=13.08$, $p<.000$; $\beta_{before}=17.86$, $p<.002$; $\beta_{after}=15.08$, $p<.000$). The empirical results show the signs of the coefficients for the 'openness of economy' variable are all negative and its effect is only significant in the overall period ($\beta_{overall}=-168.95$, $p<.003$).

Among political variables, the 'right party control' variable and 'election' variable do not have a significant influence on education spending. The 'coalition government' variable only has a significant, but negative relationship with education spending after reunification ($\beta_{after}=-26.48$, $p<.001$).

The impacts of the 'public employees' variable are found to have a positive and significant influence on education spending ($\beta_{overall}=52.81$, $p<.000$; $\beta_{before}=55.53$, $p<.000$; $\beta_{after}=32.49$, $p<.000$).

However, the 'indirect tax ratio' has no significant effect on education spending; while the 'deficit ratio' has a positive relationship with education spending after reunification (β_{after}=1.44, p<.138).

Determinants of Economic Services Spending

Table 4.17. Determinants of Per Capita Economic Services Spending

Variables	Overall (1972-2006)		Before Reunification (1972-1990)		After Reunification (1991-2006)	
Reunification	159.4188	***				
Constant	991.1072	***	1199.824	**	475.821	
Socio-Economic Variables						
Per Capita GDP	0.0002		0.00393		0.00097	
Population Density	-0.0919	***	0.01371		-0.11745	***
Population under 18 (%)	-17.27475	***	-24.0338	***	1.35909	
Population over 65 (%)	-29.76625	***	-21.33262		-20.55054	***
Unemployment Rate (%)	15.99031	***	1.90185		24.78705	***
Openness of Economy (%)	30.9175		-104.2911	**	135.6923	*
Political Variables						
Right Party Control	68.88451	***	66.61105	***	85.98227	***
Election	5.68814		14.30036		2.93302	
Coalition Government	34.53314	***	7.32063		36.63765	***
Institutional Variables						
Public Employees (%)	54.30066	***	2.62319		80.55737	***
Indirect Tax Ratio (%)	0.22227		-2.11962		0.81029	
Deficit Ratio (%)	-0.2905		-1.72946		2.20578	
F-value	122.33		1377.11		1646.36	
Prob > F	0		0		0	
R-squared	0.706		0.6535		0.581	

Note: ***p<0.01, **p<0.05, *p<0.10

The coefficient of the reunification dummy variable is 159.41 (p<.001). This suggests that reunification has a strong and positive influence on per capita economic services spending; the higher level of per capita economic services spending was primarily affected by German reunification.

In contrast to expectations, few factors exhibit positive and statistically significant effects on economic services spending. The empirical results show that the impacts of the 'per capita GDP' variable are all insignificant. The 'population density' variable has a significant but negative effect on economic services spending in the overall and after-reunification periods ($\beta_{overall}$=-0.0919, p<.002; β_{after}=-0.1174, p<.000). The impacts of the 'young population' and 'elderly population' variables are either significant with negative signs or not significant.

On the other hand, the effects of the 'unemployment rate' variable generally conform to expectations; it has a strong and positive impact in both the overall and after-reunification periods ($\beta_{overall}$=15.99, p<.000; β_{after}=24.78, p<.000). Interestingly, the influence of the 'openness of economy' variable is different before and after reunification, while its impact in the overall period is not significant. The result shows that reunification leads to a strong and positive relationship between 'openness of economy' and economic services spending (β_{before}=-104.29, p<.014; β_{after}=135.69, p<.061).

The 'right party control' variable is found to have a strong and positive impact on economic services spending regardless of the period ($\beta_{overall}$=68.88, p<.002; β_{before}=66.61, p<.000; β_{after}=85.98, p<.001). It is interesting to note, however, that its impact becomes stronger after reunification. The impact of the 'election' variable is found to be non-significant for every period. On the other hand, the 'coalition government' variable has a strong and positive influence in the overall and after-reunification periods, though its impact is not significant before reunification ($\beta_{overall}$=34.53, p<.008; β_{after}=36.63, p<.005).

Of all the institutional variables, the statistical analysis reveals that only the 'public employees' variable has a positive and significant influence on economic services spending after reunification ($\beta_{overall}$=54.30, p<.001; β_{after}=80.55, p<.000). Both 'indirect tax ratio' and 'deficit ratio'

variables are found to have no significant influence on economic services spending.

Determinants of Health Spending

Table 4.18. Determinants of Per Capita Health Spending

Variables	Overall (1972-2006)		Before Reunification (1972-1990)		After Reunification (1991-2006)	
Reunification	14.49792					
Constant	1198.354	***	316.7767		493.6455	
Socio-Economic Variables						
Per Capita GDP	0.00007		0.01014	***	-0.00215	
Population Density	-0.10163	***	-0.12872	***	-0.06201	**
Population under 18 (%)	-18.41177	***	-4.70666		6.76577	
Population over 65 (%)	-38.7136	***	-9.2348		-24.92384	***
Unemployment Rate (%)	-0.80249		3.01031		-3.33265	
Openness of Economy (%)	-55.16636		9.47227		-96.72371	
Political Variables						
Right Party Control	-3.17653		1.86708		-10.05921	
Election	-0.00022		10.15373		-7.61857	
Coalition Government	-11.55913		-12.25663		-12.75911	
Institutional Variables						
Public Employees (%)	98.59796	***	96.36265	***	90.74965	***
Indirect Tax Ratio (%)	-3.10232	***	-4.65165	***	-0.94463	
Deficit Ratio (%)	-3.83599	***	-2.64308	***	-6.88764	***
F-value	426.11		2783.53		411.88	
Prob > F	0		0		0	
R-squared	0.6522		0.9094		0.5946	

Note: ***p<0.01, **p<0.05, *p<0.10

The empirical results suggest that the reunification variable has a positive impact on the level of health spending ($\beta = 14.49$), but the value of the coefficient is not significant. Thus, it is assumed that reunification does not have any significant impact on the level of health spending.

By the same token, the effects of most of variables do not fulfill theoretical expectations of their effects on health spending after reunification.

The 'per capita GDP' variable only satisfies theoretical assumptions before reunification (β_{before}=0.0101, p<.000). The 'population density' variable is found to have a significant effect on health spending in each period examined in the study – but the signs of the coefficients in all periods are negative ($\beta_{overall}$=-0.1016, p<.000; β_{before}=-0.1287, p<.000; β_{after}=-0.0620, p<.011). The coefficient values for the 'young population' variable are positive, but not significant after reunification (β_{after}=6.76, p<.505); though the coefficient in the overall period is significant ($\beta_{overall}$=-18.41, p<.000). The coefficient values of the 'elderly population' variable for the overall and after-reunification periods are significant, but the directions of the effects are negative. It is interesting to note that the 'unemployment rate' and 'openness of economy' variables have no significant effect with a negative sign. Unexpected results are also found in the analysis of political variables. No single variable in this category has a significant impact on health spending for any of the periods, and their directions are also mostly negative.

Among the institutional variables, the effect of the 'public employees' variable is consistent with theoretical expectations for every period of interest ($\beta_{overall}$=98.59, p<.000; β_{before}=96.36, p<.000; β_{after}=90.74, p<.000). It is also interesting to note that the negative effects of the 'indirect tax ratio' changed from significant before reunification to insignificant after reunification. The 'deficit ratio' variable is found to have a significant effect on health spending in every period of interest, but the signs of the coefficients in all periods are negative ($\beta_{overall}$=-3.83, p<.002; β_{before}=-2.64, p<.003; β_{after}=-6.88, p<.001).

Determinants of Public Safety Spending

Table 4.19. Determinants of Per Capita Public Safety Spending

Variables	Overall (1972-2006)		Before Reunification (1972-1990)		After Reunification (1991-2006)	
Reunification	11.56131					
Constant	-524.3997	***	-51.13485		-355.0482	**
Socio-Economic Variables						
Per Capita GDP	0.0075	***	0.00372	*	0.00663	***
Population Density	0.06523	***	-0.05193	***	0.06927	***
Population under 18 (%)	1.15583		-3.22581		-8.49367	**
Population over 65 (%)	17.32777	***	0.04121		17.35424	***
Unemployment Rate (%)	10.07509	***	7.92111	***	7.61234	***
Openness of Economy (%)	-88.58479	***	-27.48219		-83.03895	**
Political Variables						
Right Party Control	17.35462	**	-1.92126		11.96081	**
Election	6.31834		6.46154		4.6664	
Coalition Government	19.70939	***	7.81229		22.03861	***
Institutional Variables						
Public Employees (%)	-12.99033	**	36.63483	***	-15.3998	***
Indirect Tax Ratio (%)	1.00355	***	1.08637		0.90216	***
Deficit Ratio (%)	0.6781		-1.51936	***	2.31445	**
F-value	816.72		2392.81		15507.22	
Prob > F	0		0		0	
R-squared	0.8923		0.9239		0.8859	

Note: ***p<0.01, **p<0.05, *p<0.10

As in the case of health spending, the empirical results reveal that reunification does not have a significant impact on the level of per capita public safety spending. Its coefficient value is 11.56 and not significant.

The effects of many variables on public safety spending turn out to be positive and significant, although some results show exceptions.

First, the empirical analysis reveals that the impacts of the 'per capita GDP' variable are consistent with the theoretical assumptions; as expected, the values of the coefficients are positive

and statistically significant ($\beta_{overall}$=0.0075, p<.000 ; β_{before}=0.0037, p<.070; β_{after}=0.0066, p<.000). Interestingly, the 'population density' variable is negatively related to public safety spending before reunification, but its sign later turns positive (β_{before}= -0.0514, p<.006; β_{after}= 0.0692, p<.000). Regarding the 'age composition' variable, the effect of the 'elderly population' variable corresponds fairly well to theoretical predictions in the overall and after reunification periods ($\beta_{overall}$=17.32, p<.000; β_{after}=17.35, p<.000). On the contrary, the impacts of the 'young population' variable are not consistent with theoretical expectations. The 'unemployment rate' variable has significant effects on public safety spending with the expected signs ($\beta_{overall}$= 10.07, p<.000; β_{before}= 7.92, p<.001; β_{after}= 7.61, p<.000). The effects of the 'openness of economy' variable are found to be significant in the overall and after-reunification periods, but the directions of the coefficients are negative.

Among the political factors, the 'right party control' variable has a significant and positive effect on public safety spending in the overall and after-reunification periods ($\beta_{overall}$= 17.35, p<.011; β_{after}= 11.96, p<.018). The 'election' variable, however, does not have any significant impact on public safety spending, although its coefficients have the expected positive signs in all time periods. The findings for the 'coalition government' variable match fairly well with expectations ($\beta_{overall}$=19.70, p<.001; β_{after}=22.03, p<.000). Another interesting result can be seen in the effect of the 'public employee' variable. Whereas it is expected that the 'public employees' variable should have significant and positive impacts on public safety spending, the results reveal that the variable has different influences before and after reunification (β_{before}=36.63, p<.000; β_{after}=-15.39, p<.000). The 'indirect tax ratio' variable has the expected positive effect on spending in the overall and after-reunification periods ($\beta_{overall}$=1.00, p<.007; β_{after}=0.9021, p<.007); its coefficient value is not significant before reunification, although it does have the positive sign (β =1.08, p<.139). The

'deficit ratio' variable has different influences on public safety spending before and after reunification (β_{before}=-1.51, p<.000; β_{after}= 2.31, p<.031).

Determinants of Defense Spending

Table 4.20. Determinants of Per Capita Defense Spending

Variables	Overall (1972-2006)		Before Reunification (1972-1990)		After Reunification (1991-2006)	
Reunification	-31.55067	***				
Constant	696.0465	***	720.7947	***	868.1219	***
Socio-Economic Variables						
Per Capita GDP	0.00131	**	0.00135	**	-0.00005	
Population Density	-0.01832	***	-0.00772		-0.01331	***
Population under 18 (%)	-4.89619	***	-5.10336	***	-10.7781	***
Population over 65 (%)	-3.56889	***	-0.15849		-12.17364	***
Unemployment Rate (%)	-2.17237	***	-2.42838	**	-2.55303	***
Openness of Economy (%)	-43.96156	***	-33.75418	***	11.6133	
Political Variables						
Right Party Control	8.25504	**	18.16797	***	10.50454	*
Election	-3.18835		-3.81095		-3.66783	
Coalition Government	-2.32489		-5.35467		-2.19351	
Institutional Variables						
Public Employees (%)	11.26926	***	11.6621	***	3.13147	
Indirect Tax Ratio (%)	-0.23646		-0.81572	**	-0.01493	
Deficit Ratio (%)	-0.03241		0.89954	**	-0.82866	***
F-value	272.78		2171.38		4795.07	
Prob > F	0		0		0	
R-squared	0.9286		0.9639		0.9268	

Note: ***p<0.01, **p<0.05, *p<0.10

The empirical results support the hypothesis that the level of defense spending is affected by German reunification (β= -31.55, p<.000). This validates the assumption that reunification led to a decrease in defense spending.

In line with the established significant impact of reunification, many variables have negative

relationships with defense spending. The 'per capita GDP' variable is found to have a positive effect (β_{before}=0.0010, p<.014); however, its coefficient value after reunification is negative but not significant (β_{after}= -0.00005, p<.937). This indicates that reunification is associated with a reduction in defense spending even if GDP rises. The 'population density' variable also has a significant and negative relationship with defense spending after reunification (β_{after}=-0.0133, p<.001). The coefficient values for the 'young population', 'elderly population', and 'unemployment rate' variables are negative and significant for every period of interest. The 'openness of economy' variable has no significant effect on defense spending after reunification (β_{after}=11.61, p<.296), although the relationship before reunification is negative and significant (β_{before}=-33.75, p<.004). Among the political factors, only the 'right party control' variable has the expected significant and positive impacts on the defense spending in the overall period ($\beta_{overall}$=17.35, p<.040; β_{before}=-18.41, p<.001; β_{after}=10.50, p<.063). All coefficient values of the 'election' and 'coalition government' variables are negative, but not significant for any period.

Among the institutional variables, the 'public employees' and 'indirect tax ratio' variables have no significant influence after reunification, even though their coefficient values before reunification are significant. The 'deficit ratio' variable also has changes direction before and after reunification (β_{before}=0.8995, p<.018; β_{after}=-0.8286, p<.003).

4.3. Fiscal Authority Change after Reunification

In addition to the analysis of significant changes in government expenditure, this study provides empirical evidence of an unequivocal shift towards fiscal centralization in Germany following reunification. The fiscal centralization trend is evident when examining changes in the Expenditure Ratio from 1972-2006, but is more marked when using the Composite Ratio.

Traditional Expenditure Ratio

As explained in the methodology section, the Expenditure Ratio measures fiscal decentralization by comparing sub-national government expenditures relative to total government expenditure. A decrease in this ratio would indicate a shift in public sector expenditures towards centralization. Evidence of such a shift can be seen in Figure 4-10. There is a slight trend towards centralization during the period before reunification; however this trend accelerates from 1990 until around 1998. The accompanying statistics in Table 4-21 confirm that fiscal authority was most centralized during the 1996-2000 period when the Expenditure Ratio reached its lowest average value of 0.40. Furthermore, the overall average Expenditure Ratio drops significantly from 0.4411 prior to reunification to 0.4107 after reunification, a decline of 6.89%. It is worthy of noting that this difference is statistically significant at the 1% level.

Figure 4.10. Expenditure Ratio

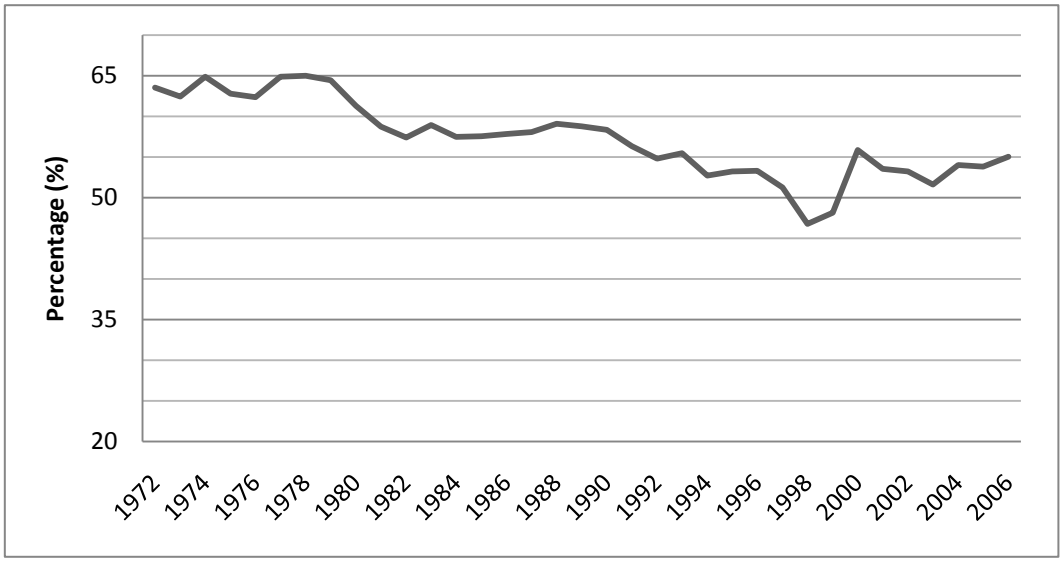


Table 4.21. Fiscal Decentralization before vs. after Reunification (Expenditure Ratio)

Expenditure Ratio	Before Reunification				After Reunification				Difference (B-A)
	'72-'80	'81-'85	'86-'90	Average (A)	'91-'95	'96-'00	'01-'06	Average (B)	
Total Spending	0.4572	0.4280	0.4253	0.4411	0.4235	0.4000	0.4090	0.4107	-0.030***
Social Security	0.2350	0.2132	0.2272	0.2272	0.2251	0.2151	0.2165	0.2187	-0.008 *
Economic Services	0.5502	0.5827	0.5430	0.5569	0.5277	0.5218	0.5490	0.5338	-0.023***
Health	0.2946	0.2881	0.2906	0.2919	0.3030	0.2094	0.0505	0.1791	-0.113***
Public Safety	0.9309	0.9322	0.9314	0.9314	0.9285	0.9245	0.8956	0.9149	-0.016***
Defense	0.0579	0.0528	0.0682	0.0593	0.1077	0.0826	0.0489	0.0778	0.019***
Education	0.9413	0.9504	0.9531	0.9468	0.9522	0.9591	0.9693	0.9608	0.014***

Note: ***p<0.01, p<0.05, *p<0.10

A pattern of fiscal centralization can also be observed in government spending on social security. The average Expenditure Ratio from 1972-1990 is 0.2272; however, during the period after reunification this average dips to 0.2187, a decline of 3.74%. This suggests an increase in federal spending on social security relative to state and local spending. Much of the change in fiscal authority for social security spending can be attributed to the importance of this sub-policy area in helping Germany cope with the socio-economic and political challenges of reunification. The social security system brought West German welfare standards to East Germans nearly overnight, mollifying any political discontent that might have arisen from the dismantling of state socialism (Streeck and Trampusch 2005). The federal government assumed a leading role in this process, as the short-term consolidation of social insurance budgets was often assisted through federal subsidies and grants.

In addition, a shift towards centralization for economic services spending is highly visible when comparing the contiguous periods directly before and after reunification. The Expenditure Ratio drops from an average of 0.5430 for the 1986-1990 to an average of 0.5277 for 1991-1995. Fedder (1996) argues that economic and monetary considerations were secondary to politics during the developments leading up to reunification. Therefore, once reunification took place, the federal

government faced the monumental task of integrating East German states into the existing economic structures. As a result of the enormity and complexity of this issue, it is likely that federal spending on economic services increased relative to state and local spending in this sub-policy category. Overall, the average expenditure ratio from 1972 to 1990 is 0.5569, while the average ratio from 1991 to 2006 is 0.5338. This decrease of 4.15% further demonstrates the trend of fiscal centralization.

Health spending exhibited the largest change in fiscal authority; the statistics in Table 4-21 reveal a major shift towards centralization in the period after reunification. The average expenditure ratio from 1972 to 1990 is 0.2919, while the average ratio from 1991 to 2006 falls to 0.1791 with a 38.64% decrease. In particular, federal spending on health services increased dramatically relative to state and local spending from 1996-2006. In this case, fiscal centralization was driven by the necessity of equalizing health care services across East and West German states. Accordingly, the federal government supported the upgrading of infrastructure through an immediate aid program of several billion Deutsche Marks, with investments directed mainly towards hospitals and nursing homes (European Observatory 2000).

The statistics in Table 4-21 also provide some evidence of fiscal centralization in spending on public safety. The average expenditure ratio from 1972 to 1990 is 0.9314, while the average expenditure ratio from 1991 to 2006 is 0.9149. These large ratios indicate that the degree of decentralization in public safety expenditures is extremely high; however, it is likely that federal assistance was required to cope with the influx of people to the West following reunification. As a result, this ratio declines by 1.77% between the two periods, while the difference is statistically significant at the 1% level.

On the other hand, education spending appears to follow a pattern of decentralization

following reunification. In Germany, states are almost completely responsible for spending on higher education, while the federal government only pays costs related to construction. The increase in state and local spending on education relative to federal spending can be explained by the addition of education spending by Eastern states into the total sub-national expenditures. The expenditure ratios in Table 4-21 confirm the high degree of decentralization: the average expenditure ratio from 1972 to 1990 is 0.9468, while the average ratio from 1991 to 2006 is 0.9608.

Change in fiscal authority for defense spending also follows a similar pattern. As seen in Table 4-21, the degree of decentralization increases substantially immediately following reunification. The Expenditure Ratio increases from 0.0682 during the period right before unification (1986-1990) to 0.1077 in the period just after reunification (1991-1995). A reduction in tension following reunification is one plausible explanation for the significant decline in federal defense spending relative to state and local spending.

Composite Ratio

By examining the expenditure and revenue perspective of public sector finance jointly, the Composite Ratio is able to measure changes in fiscal authority with a greater degree of accuracy than other measures. Like the Expenditure Ratio, a decrease in the Composite Ratio indicates a shift toward fiscal centralization. Consistent with the expectations of this study, Figure 4-11 displays a major decrease in the Composite Ratio from 1991 to 1998, the period directly after reunification.

The breakdown of the composite ratio in Table 4-22 verifies a pattern of increasing fiscal decentralization in the late 1980s that shifted toward centralization after reunification. Overall, the average composite ratio between the periods before reunification and after reunification drops significantly: 0.6071 (1972-1990) to 0.5306 (1991-2006). As a result, this ratio declines by 12.6%

between the two periods, while the difference is statistically significant at the 1% level.

Figure 4.11. Composite Ratio

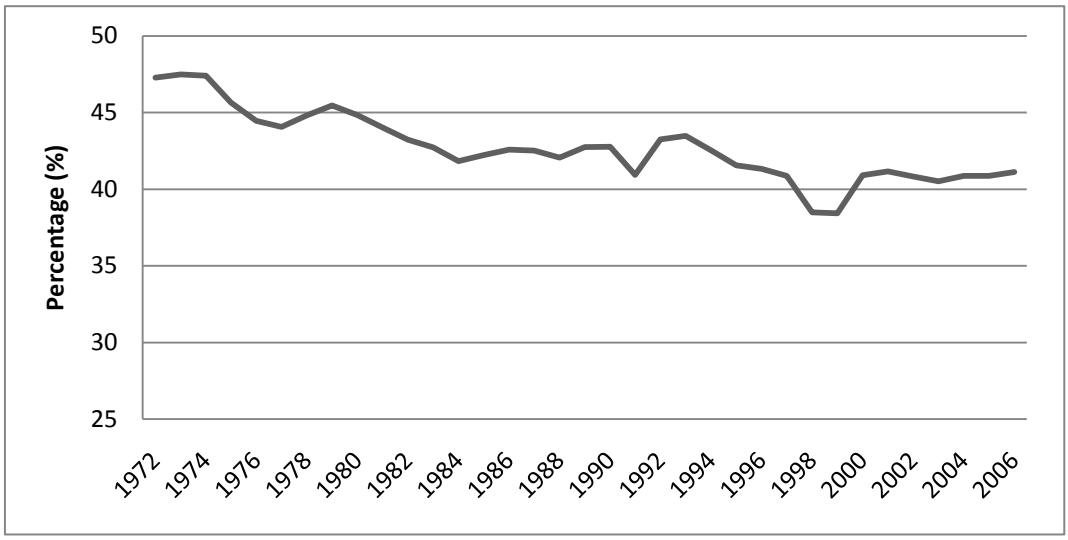


Table 4.22. Fiscal Decentralization Before vs. After Reunification (Composite Ratio)

Composite Ratio	Before Reunification				After Reunification				Difference
	'72-'80	'81-'85	'86-'90	Average	'91-'95	'96-'00	'01-'06	Average	(B-A)
Total Spending	0.6350	0.5800	0.5840	0.6071	0.5450	0.5106	0.5354	0.5306	-0.0765***

***p<0.01, p<0.05, *p<0.10

In particular, the ratio declines by almost 7% from the period right before reunification to the period directly after reunification; this indicates a significant shift towards fiscal centralization immediately following reunification. However, as seen in Figure 4-11 and confirmed in Table 4-22, the most notable drop in the composite ratio occurs from 1996-2000. This coincides with the complete integration of the Eastern states into the German fiscal system. From 2001-2006 the ratio begins to climb again indicating a return to a more decentralized fiscal system; though, the composite ratio is still lower than what it had been prior to any point before reunification.

Chapter 5

Theoretical Discussions and Implications

Having described how German government expenditure changed in terms of size, composition, and fiscal authority following reunification, this chapter discusses the reasons for those changes and the implications that can be drawn from the various theories developed in Chapter 3 in light of the empirical data.

Since one of the main claims of this paper centers on how theories about government expenditure changes work in total spending and major sub-policy spending categories following reunification, this study analyzes empirical results in the German context and briefly presents implications of particular relevance to the social disturbance.

5.1. Displacement Effect Type and Social Security Spending

Displacement Effect Type

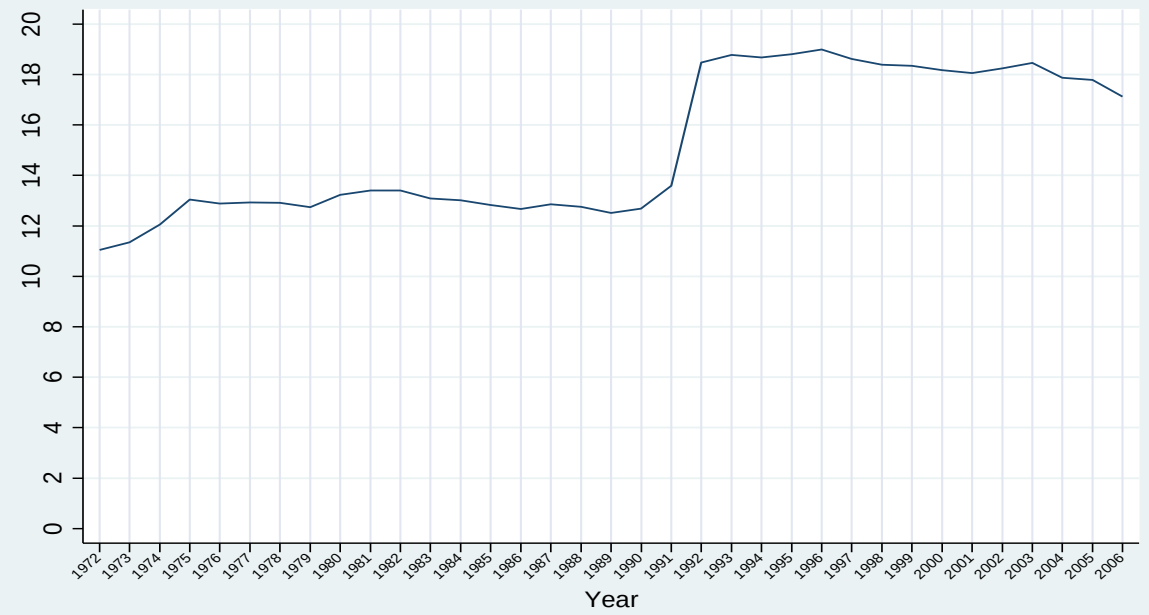
As explained in Chapter 4, empirical results statistically reveal that a displacement effect associated with German reunification influenced government expenditures in the study period. Average per capita total spending after reunification is almost twice that before reunification. In particular, as time goes on after reunification, per capita total spending increases more. Average per capita spending steadily increases from 9,690 Euros between 1991 and 1995, to 10,786 Euros between 1996 and 2000, and 11,583 Euros between 2001 and 2006. Therefore, while there is clear evidence of upward displacement, it is also worthwhile to clarify the type of displacement effect that has taken place. Henrekson (1994) identifies three versions of the displacement effect: a *strong version,* in which real absolute government expenditure per capita evolves in a stepwise pattern with

the movement from one step to another coinciding with major social disturbances; a *semi-strong version,* in which total government expenditure as a share of GDP evolves in this same fashion; and a *weak version*, in which the ratio of government expenditure to GDP follows an upward sloping trend in normal times, and this trend is shifted permanently upward following a social upheaval.

As already seen in Figure 4-1, there is a major jump in per capita expenditures as a result of reunification. However, the increase does not seem to follow the stepwise pattern predicted in Henrekson's *strong version*. In addition, the ratio of total government expenditures to GDP does not show a slight upward-sloping trend before and after German unification, thus German government expenditures do not seem to follow Henrekson's *weak version*.

On the other hand, the ratio of total expenditures to GDP, as shown in Figure 5-1, appears to follow a stepwise pattern that is similar to the *semi-strong version* of displacement. There is a stable trend before reunification and a significant increase immediately after reunification, but the ratio begins to decrease very slightly after 1996. However, it does not fall by much and remains significantly higher than it had been prior to the social disturbance.

Figure 5.1. Total Expenditure as Share of GDP



The Displacement Effect and Social Security Spending

During most social disturbances, the social security function of government, such as pensions and unemployment insurance, is of paramount importance because of the prospect that many people will lose jobs and economic markets will not be stable. Although each country has a different level of social security function and different restrictions, during periods of social upheaval social security spending is likely to continue to rise. Therefore, it may be argued that the social security function would be the most critical area that governments must deal with during social disturbances.

In the case of German reunification, as shown in Figure 4-2, per capita social security spending is 3,044 Euros before reunification and 6,436 Euros after reunification. Per capita social security spending shows a big jump immediately after reunification since many policy changes and government interventions were undertaken in the area of social security services. For example, the

Pension Reform Act of 1992 introduced the following changes to the pension system: 1) federal subsidies to the pension system were indexed and thereby made automatic; 2) the relevant contribution period was modified and more generous arrangements were made concerning the work history of women; 3) pensions were indexed to net rather than gross wage developments, and discount factors for early retirement were added; 4) the general retirement age was increased (Frerich and Frey 1996, 255-256).[20]

Recognizing that the social security budget was not sustainable, the German government attempted to reign in social security spending through several measures. However, a political unwillingness to cut spending combined with meager policies resulted in a failure to reduce social security expenditures. For example, the government instituted the Law for the Promotion of Growth and Employment Act in 1997 to reduce the generosity of pension payments; though a year later the act was essentially revoked by the new government. Additionally, attempts to increase contributions were poorly designed and typically wound up requiring ad hoc measures on the revenue and expenditure sides in order to stabilize the contribution rates.

In short, the displacement effect during a social disturbance may be driven mainly by large increases in social security spending, which account for the majority of total spending. The social security function of government is greatly affected by social disturbances, and therefore cannot be reduced easily.

5.2. Effects of Government Expenditure Determinants

The standard model in the literature assumes that there are a number of factors that are likely to play roles in determining government expenditure change; government expenditure change

[20] However, this pension reform resulted in huge financial burdens and deficits.

is a function of socio-economic variables, political variables, and institutional variables. Therefore, this section tests the validity of major theories on total spending and its allocation to functional categories. It also provides discussion of why those results came about in the context of German reunification and what implications they have in relation to social disturbance.

5.2.1. Socio-Economic Determinants

Wagner's Law

Per Capita GDP

Table 5.1. Relationship of Per Capita GDP with Government Expenditure

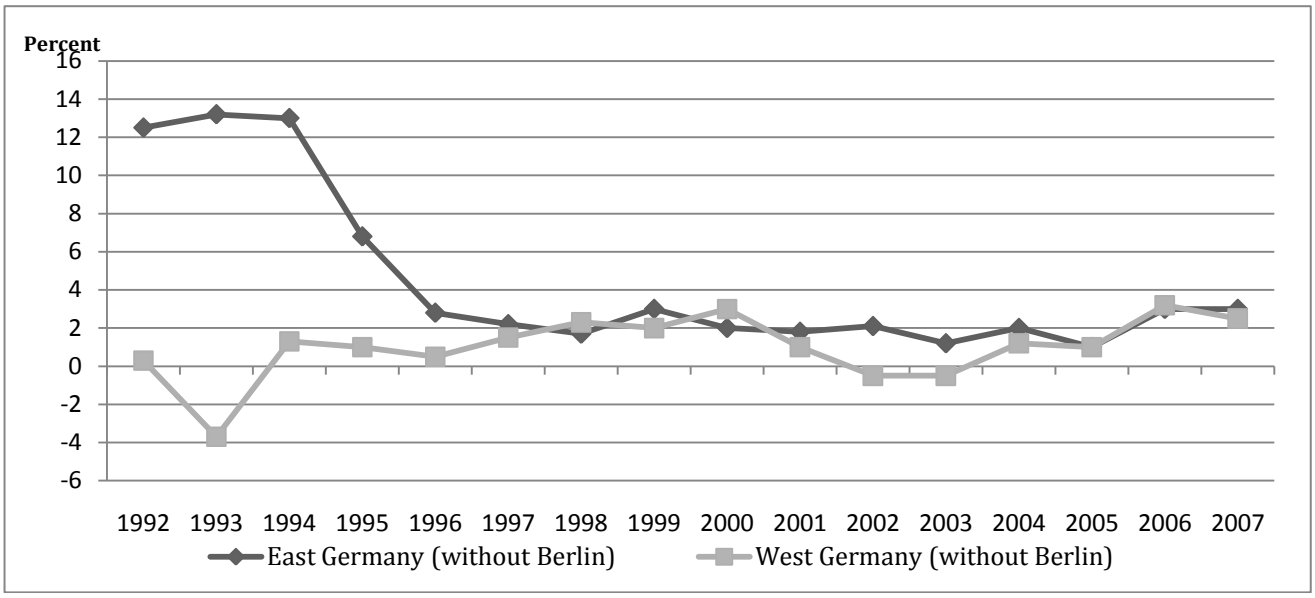
Per Capita GDP	Overall (1972-2006)	Before Reunification (1972-1990)	After Reunification (1991-2006)
Total Per Capita Spending			
Coefficient	0.04225 ***	0.06334 ***	0.04129 ***
Std. Err.	(0.00494)	(0.01979)	(0.00490)
Social Security			
Coefficient	0.00617 *	0.00891	0.01608 ***
Std. Err.	(0.00326)	(0.00582)	(0.00231)
Education			
Coefficient	0.01092 ***	0.01113 *	0.01015 ***
Std. Err.	(0.00144)	(0.00507)	(0.00183)
Economic Services			
Coefficient	0.00020	0.00393	0.00097
Std. Err.	(0.00156)	(0.00246)	(0.00175)
Health			
Coefficient	0.00007	0.01014 ***	-0.00215
Std. Err.	(0.00189)	(0.00194)	(0.00321)
Public Safety			
Coefficient	0.00750 ***	0.00372 *	0.00663 ***
Std. Err.	(0.00102)	(0.00185)	(0.00109)
Defense			
Coefficient	0.00131 **	0.00135 **	-0.00005
Std. Err.	(0.00046)	(0.00046)	(0.00067)

Note: ***p<0.01, **p<0.05, *p<0.10

The effect of per capita GDP on total government expenditures during the study period in Germany is found to be in line with Wagner's Law. Between 1972 and 2006, the coefficient of per

capita GDP with total expenditure is positive and statistically significant ($\beta_{overall}$=0.0422, p<.000). The coefficient of before (β_{before}=0.0633, p<.008) and after reunification (β_{after}=0.0412, p<.000) are also significant. As Figure 5-2 illustrates, after a temporary decrease in per capita GDP in the years immediately following reunification, GDP continues to increase. As a result, Wagner's Law is confirmed in Germany, showing that as per capita GDP increases, government spending also grows. After reunification, a positive correlation between per capita GDP and government spending can also be found in social security, education, and public safety spending.

Figure 5.2. Annual Growth Rate of Real Per Capita GDP in East and West Germany



Source: Federal Statistical Office of Germany

The positive and robust relationship in social security spending after unification is particularly noticeable (β_{after}=0.1608, p<.000), while the relationship is not statistically significant before reunification (β_{before}=0.0089, p<.008). This implies that as the per capita GDP increased the government raised social welfare spending in an effort to provide assistance for the unemployed and pensions for the elderly (Hunt 2006), as well as to combat income inequality between East and West. It is possible that social disturbances can lead to high unemployment and economic downturn, two

problems that adversely affect living conditions and are not quickly overcome. Moreover, though per capita GDP may rise slightly following social disturbances, social security expenditures are likely to continue rising. Similarly, Easterly and Rebelo (1993) found that social security expenditure growth is driven by increasing income in a cross-sectional data analysis of 100 countries during the post-oil crisis period from 1970 to 1980.

In this study, per capita GDP exhibited a well-defined positive relationship with government expenditure, confirming the Wagner's Law. However, it may be argued that in times of social disturbance, increases in government expenditure acts as a cause of GDP growth. In fact, although empirical findings are consistent with the expectations of Wagner's Law, whether public expenditure is an endogenous factor or exogenous factor is an important distinction in trying to interpret the impact of per capita GDP on government spending. Many studies have found that government expenditure and income growth have a bicausal relationship (Pluta 1979; Barro 1991; Henrekson 1993; Abizadeh and Yousefi 1998). This implies that government expenditure is both a causal factor for and the consequence of the income growth.

However, it is likely that the causality from government spending to income is more affirmative in times of social disturbance. When a social disturbance occurs, the economy undergoes downturns, such as high unemployment rate and lower private sector investment, which is likely to lead to a decrease in personal income. Accordinlgy, the government would immediately expand its role by increasing expenditure to stimulate economic growth and improve personal welfare. In other words, the increase in government spending would be designed and implemented to revive the economcy and stablize public welfare (Ghali 1999). However, government expenditure growth may be accelerated by income growth after the economy can become revived and stabilized; once the economy has recovered, steady improvement of personal income level may lead to the government

expenditure growth.[21]

In sum, expansion of government spending is likley to cause income growth in the short run while the causality would flow from income growth to government spending increase in the long run, when the periods of social disturbance has passed.

Population Density

Table 5.2. Relationship of Population Density to Government Expenditure

Population Density	Overall (1972-2006)	Before Reunification (1972-1990)	After Reunification (1991-2006)
Per Capita Total Spending			
Coefficient	0.27915 ***	-0.23478	0.32267 ***
Std. Err.	(0.07048)	(0.14287)	(0.03482)
Social Security			
Coefficient	0.09764 ***	0.12009	0.17167 ***
Std. Err.	(0.01840)	(0.07672)	(0.02013)
Education			
Coefficient	-0.03383 ***	-0.13509 ***	0.01683 *
Std. Err.	(0.01043)	(0.04303)	(0.00826)
Economic Services			
Coefficient	-0.09190 ***	0.01371	-0.11745 ***
Std. Err.	(0.02431)	(0.04836)	(0.01905)
Health			
Coefficient	-0.10163 ***	-0.12872 ***	-0.06201 **
Std. Err.	(0.01515)	(0.02282)	(0.02143)
Public Safety			
Coefficient	0.06523 ***	-0.05193 ***	0.06927 ***
Std. Err.	(0.00668)	(0.01530)	(0.00466)
Defense			
Coefficient	-0.01832 ***	-0.00772	-0.01331 ***
Std. Err.	(0.00350)	(0.00751)	(0.00346)

Note: ***p<0.01, **p<0.05, *p<0.10

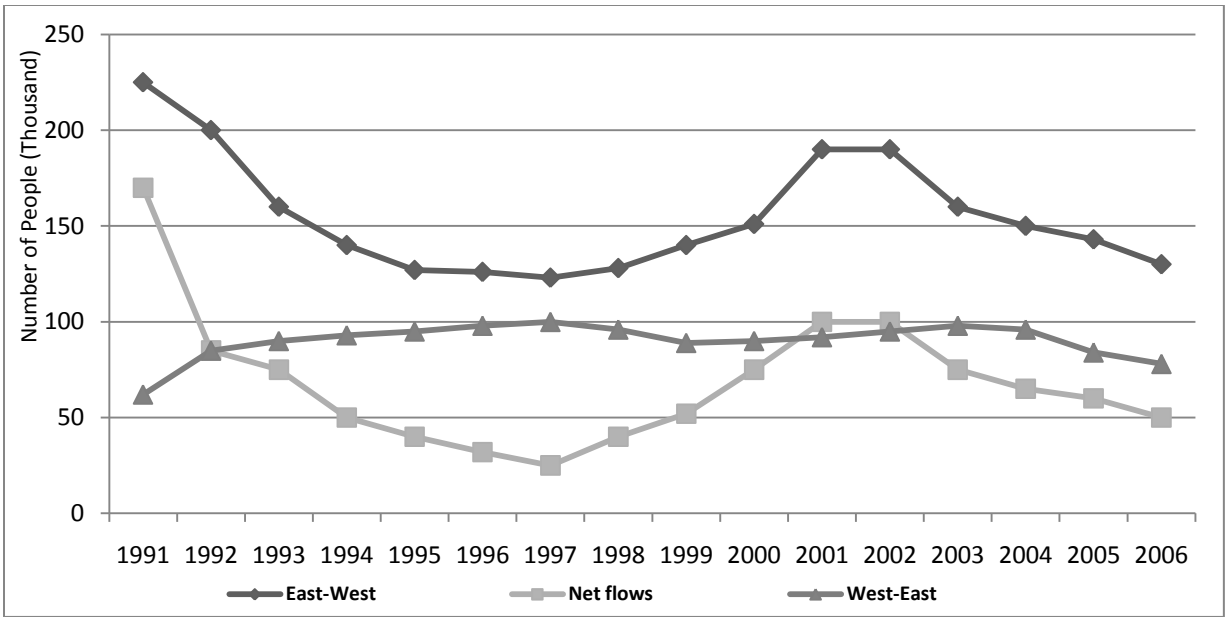
In Germany's case, the empirical evidence suggests that population density is positively correlated with total government expenditure for the entire period ($\beta_{overall}$=0.2791, p<.001). In

[21] Similarly, some previous research by Barro (1991), Barro and Aala-i-Martin (1995) suggest that fiscal policy can determine the level of economic output as well as its growth rate.

particular, population density has a positive and statistically significant sign after reunification (β_{after}=0.3226, p<.000), compared to negative and not statistically significant before reunification.

A similar trend is found in social security, education, and public safety spending. This implies that, following reunification, 'diseconomies of scale' were at work in many policy areas, meaning that as more public services were provided, the average cost of producing public services increased. In Western Germany, increases in population density are followed by increases in demand for more and better public services in those spending areas. Moreover, it can be inferred that in Eastern Germany, with its decreasing population, the per capita cost of producing certain units of public services will be higher, because there are fewer people among whom the fixed costs could be distributed.

Figure 5.3. Migration between Eastern and Western Germany (1991-2006)



Source: Federal Statistical Office of Germany based on Fuchs-Schundeln and Schundeln (2009)

As expected, most regions in Western Germany experienced population gains while most regions of the East lost population. Figure 5-3 shows that around 2.45 million people migrated from the East to the West during the period from 1991 to 2006, while only 1 million people moved from the West to the East in the same period. The Western migration also resulted in a decline in the

number of working-age people in Eastern Germany. As a result, the government was compelled to provide funding to the western half of the country to solve the increasing demand for public services caused by the migration of East Germans. In the process of addressing unexpected and continuous congestions in the West, managerial problems in efficiently controlling and coordinating operations and increases in the time and resources required to service provision and communication further increased public spending.

On the other hand, when looking at economic services, higher population density is associated with lower per capita expenditure during the whole period and after the reunification ($\beta_{overall}$=-0.0919, p<.002; β_{after}=-0.1174, p<.000). This relationship is also found in health spending ($\beta_{overall}$=-0.1016, p<.000; β_{after}=-0.0620, p<.011). It can be argued that there is 'economies of scale' at work in West Germany, which has enough capacity in economic and industrial infrastructure and thus is less likely to face capacity constraints. Accordingly, most economic services and infrastructure were not over-extended by the growing number of people. Conversely, in East Germany, a larger increase in public spending was needed to modernize infrastructure, transportation networks, and telecommunications even as population density was decreasing.

In the case of social disturbance accompanied by immigration, change in population density may have different effects on functional categories of government expenditure. In Germany, the existence of constant returns to scale in the production of government services, which leads to decreases in government expenditures as a result of increase in population density, is not found in total spending and consumption spending area such as social security, education, and public safety.

These results are consistent with certain published findings indicating that there is a positive relationship between population density and government expenditure (Ladd 1992; Ewing 1997; Holcombe and Williams 2008).

Age Composition

Proportion of Population under 18

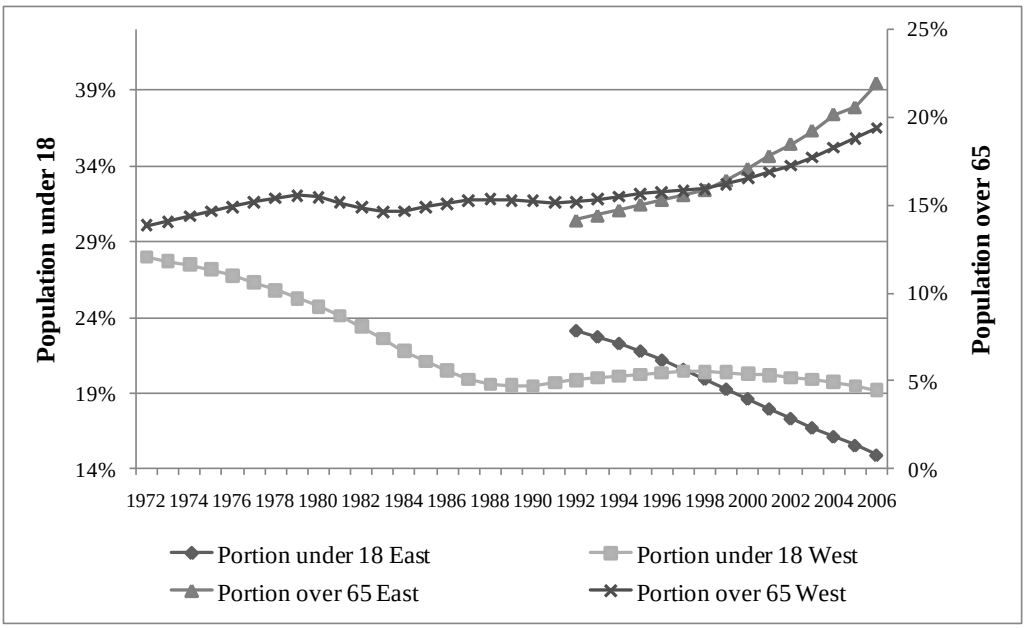
Table 5.3. Relationship of Proportion of Population under 18 to Government Expenditure

Population under 18 (%)	Overall (1972-2006)		Before Reunification (1972-1990)		After Reunification (1991-2006)	
Per Capita Total Spending						
Coefficient	-31.22347		-17.72190		-66.29343	**
Std. Err.	(19.10889)		(40.22992)		(24.99795)	
Social Security						
Coefficient	-46.81096	***	-35.04430	**	32.35299	***
Std. Err.	(7.28182)		(12.69569)		(9.52432)	
Education						
Coefficient	-12.80398	***	-10.58283		23.93978	***
Std. Err.	(3.92143)		(7.97091)		(5.85907)	
Economic Services						
Coefficient	-17.27475	***	-24.03380	***	1.35909	
Std. Err.	(4.43209)		(7.11525)		(9.76666)	
Health						
Coefficient	-18.41177	***	-4.70666		6.76577	
Std. Err.	(4.23211)		(4.25350)		(9.91744)	
Public Safety						
Coefficient	1.15583		-3.22581		-8.49367	**
Std. Err.	(3.11096)		(3.31994)		(3.59348)	
Defense						
Coefficient	-4.89619	***	-5.10336	***	-10.77810	***
Std. Err.	(1.22656)		(1.23080)		(2.32099)	

Note: ***p<0.01, **p<0.05, *p<0.10

In general, the decline in the proportion of young people in Germany's population coupled with total government spending growth results in a negative and significant relationship after reunification. As shown in Figure 5-4, the proportion of youth in the West increased with the introduction of the East German population until approximately 1997, and then began to fall. The combination of the westward migration of many young and highly skilled people along with low fertility rates explain why the population of Eastern Germany fell much faster than its Western counterpart. Therefore, it is no surprise that there is a negative relationship, brought on by the simultaneous declining youth population and the increasing government expenditure.

Figure 5.4. Distribution of Young and Elderly Germans



However, per capita education spending is positively linked with the proportion of young population after reunification (β_{after}=23.93, p<.001), as spending decreases along with the school-age population. The low fertility rate (as low as 0.8 children per woman) that produced a sharp decline in the youth population in the former East German states (Seitz 2007), and large cuts to education budgets in the *Länder,* are some of the reasons explaining the direction of this relationship.

An interesting finding is that the relationship between social security spending and the proportion of population under 18 years old is positive and significant after reunification (β_{after}=32.35, p<.004), while the effect prior to reunification is negative but beyond commonly accepted significance levels.

Proportion of population over 65

Table 5.4. Relationship of Proportion of Population Over 65 to Government Expenditure

Population over 65 (%)	Overall (1972-2006)		Before Reunification (1972-1990)	After Reunification (1991-2006)	
Per Capita Total Spending					
Coefficient	-5.57352		-3.07344	-57.75075	***
Std. Err.	(19.06672)		(60.49333)	(15.12355)	
Social Security					
Coefficient	-4.15988		-12.96326	65.13138	***
Std. Err.	(10.07328)		(18.77600)	(5.29905)	
Education					
Coefficient	-21.75448	***	-1.46367	-9.22535	**
Std. Err.	(3.93844)		(14.52606)	(4.29132)	
Economic Services					
Coefficient	-29.76625	***	-21.33262	-20.55054	***
Std. Err.	(3.74721)		(12.39650)	(5.45612)	
Health					
Coefficient	-38.71360	***	-9.23480	-24.92384	***
Std. Err.	(5.03813)		(6.89189)	(6.75957)	
Public Safety					
Coefficient	17.32777	***	0.04121	17.35424	***
Std. Err.	(2.70203)		(5.42789)	(3.29384)	
Defense					
Coefficient	-3.56889	***	-0.15849	-12.17364	***
Std. Err.	(1.10017)		(2.30159)	(2.25623)	

Note: ***p<0.01, **p<0.05, *p<0.10

As a general hypothesis, an increase in the proportion of elderly people in the population is expected to be associated with rising levels of general government expenditure (Bryant 2003; Sanz and Velázquez 2007). In contrast to the theoretical expectations, the results of this study indicate that there is a negative relationship between the proportion of elderly people in the German population and overall government spending – a relationship which becomes stronger and achieves higher significance levels after reunification. Moreover, these findings extend to the majority of sub-policy spending categories such as education, economic services, health, and defense with the same distinctive feature of being more significant after reunification.

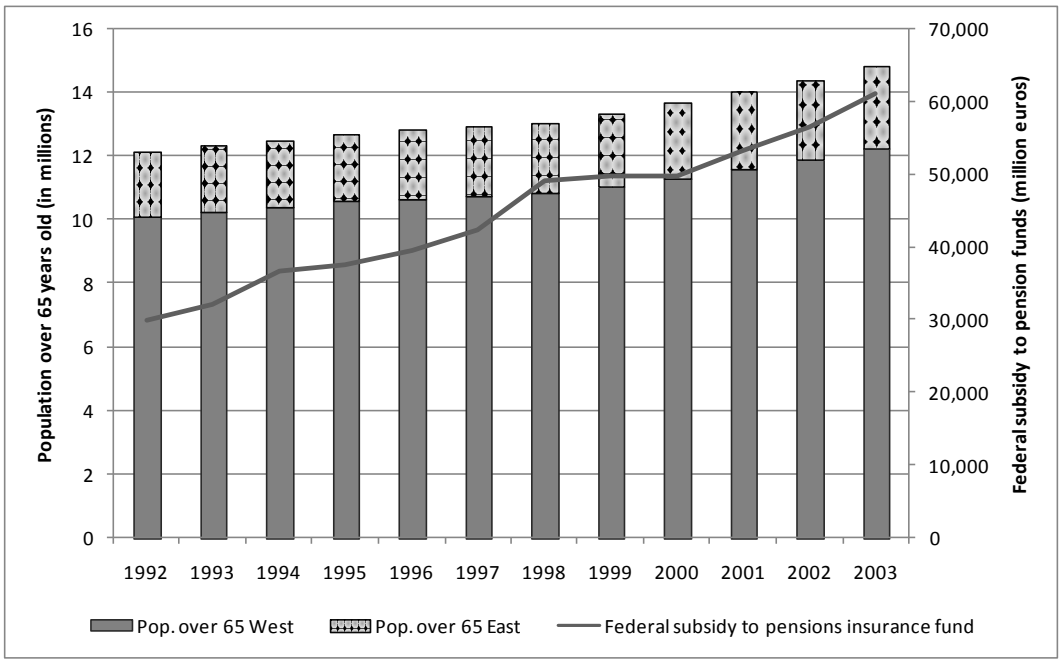
These outcomes imply that continued increases in per capita spending throughout the study

period prove insufficient to meet the needs or desires of the elderly as their numbers have continued to rise faster than spending (Börsh-Supan and Wilke 2004). With spending unable to match the growth of the elderly population, the German government has not provided enough funds to maintain the same level of public care for the elderly. Considering that a significant share of government expenditure after reunification was allocated to support the German labor force, including transfers to cope with unemployment and struggling industry in the East, the negative relationship is understandable.

After 1991 this relationship can be noticeably seen in the case of public health spending, which experienced drastic cuts following reunification that led to declining standards of public health coverage as the proportion of elderly Germans continued to rise. In particular, the dire drop in government spending on health is due to the series of reforms during the 1990s to ease the burden on the public treasury associated with health care. Among the measures introduced to achieve this purpose that had a negative effect on the elderly population were the implementation of co-payments, user fees, rationalization of benefits, and mixed-payment systems (Carrera et al. 2008).

Conversely, the empirical evidence shows that the relationship between the elderly as share of total population and expenditure on social security is positive and significant only after reunification. The problems that long bedeviled the German social security system were partially addressed by the 1992 reform that reduced the incentives for early retirement, but its effects were only palpable in subsequent years (Borsch-Supan 1997; Borsch-Supan and Schnable 1998). As a result, federal transfers increased over time in the pay-as-you-go system, as seen in Figure 5-5.

Figure 5.5. Federal Subsidies to Pension Funds and Elderly Population (in millions)



Source: the Association of German Pension Insurance Institutes (Verband der Deutschen Rentenversicherungstrager)

Intuition tells us that a social disturbance magnifies the need for government support and spending in various policy categories, and such spending changes are likely to be incompatible with the increasing needs of a growing elderly population. Given the situation of increasing public spending to cope with the needs of other disadvantaged populations and sectors, a social disturbance may lead the governments to allocate insufficient funding for health services and to limit funding for programs directed at the needs of the elderly. In particular, the stress of supporting a growing number of elderly citizens with incomplete services may make demographic transition much more difficult, and leave the elderly population more vulnerable to further social shocks while saddling the government with even greater fiscal burdens.

Counter-Cyclical Policy

Table 5.5. Relationship of Unemployment Rate to Government Expenditure

Unemployment Rate (%)	Overall (1972-2006)		Before Reunification (1972-1990)		After Reunification (1991-2006)	
Per Capita Total Spending						
Coefficient	108.96200	***	73.24243	***	151.38240	***
Std. Err.	(10.27692)		(12.94661)		(7.51918)	
Social Security						
Coefficient	0.52138		13.26830	**	15.25163	***
Std. Err.	(4.13859)		(4.62389)		(1.95213)	
Education						
Coefficient	13.08318	***	17.86128	***	15.08960	***
Std. Err.	(2.60214)		(4.56389)		(1.84490)	
Economic Services						
Coefficient	15.99031	***	1.90185		24.78705	***
Std. Err.	(3.14559)		(2.68058)		(2.09166)	
Health						
Coefficient	-0.80249		3.01031		-3.33265	
Std. Err.	(3.09479)		(2.55522)		(4.96849)	
Public Safety						
Coefficient	10.07509	***	7.92111	***	7.61234	***
Std. Err.	(1.50372)		(1.73634)		(1.08335)	
Defense						
Coefficient	-2.17237	***	-2.42838	**	-2.55303	***
Std. Err.	(0.62088)		(1.03489)		(0.45737)	

Note: ***p<0.01, **p<0.05, *p<0.10

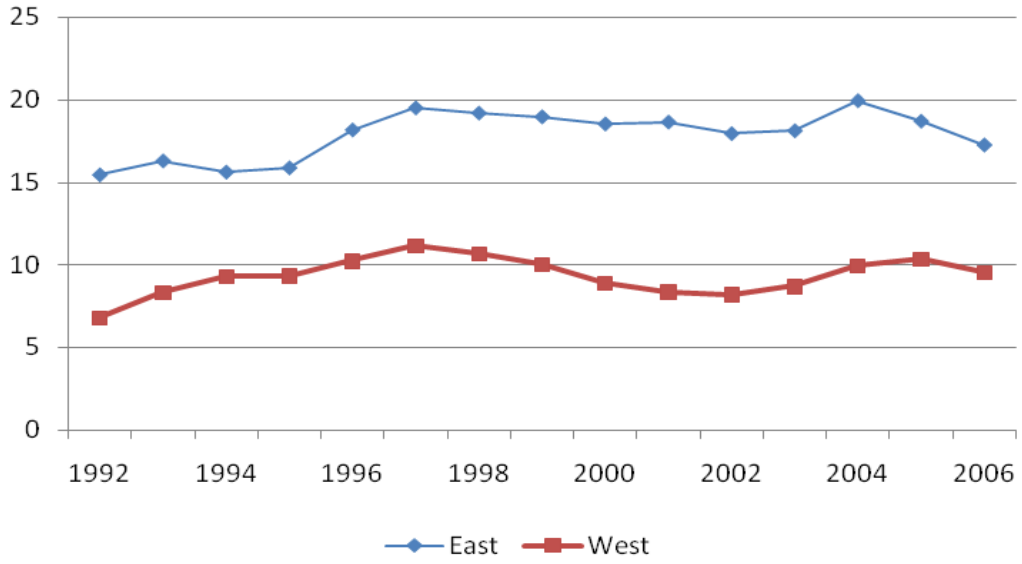
The unemployment rate, one of the most serious problems facing Germany today, appears to be positively related to spending on a number of sub-policy categories. This finding implies that Germany's fiscal policy has been used as a tool to stabilize the business cycle and to combat unemployment (Siebert 2004).

Empirical evidence indicates that there is a positive correlation between total government spending and the rate of unemployment throughout the whole period ($\beta_{overall}$=108.96, p<.000). Correlations are also positive and significant before and after reunification (β_{before}=73.24, p<.000; β_{after}=151.38, p<.000).

After reunification, the unemployment rates in both Eastern and Western Germany soared. Though the German economy is still very competitive internationally, the country has suffered from

high unemployment and low levels of participation in the labor market. As seen in Figure 5-6, Eastern Germany has experienced a rise in unemployment from 15% to 20% in the post-reunification period, while Western Germany has endured an average unemployment rate of 10% during the same period due to an increase in payroll taxes and social security contributions (Siebert 2004).

Figure 5.6. Unemployment Rates in Eastern and Western Germany



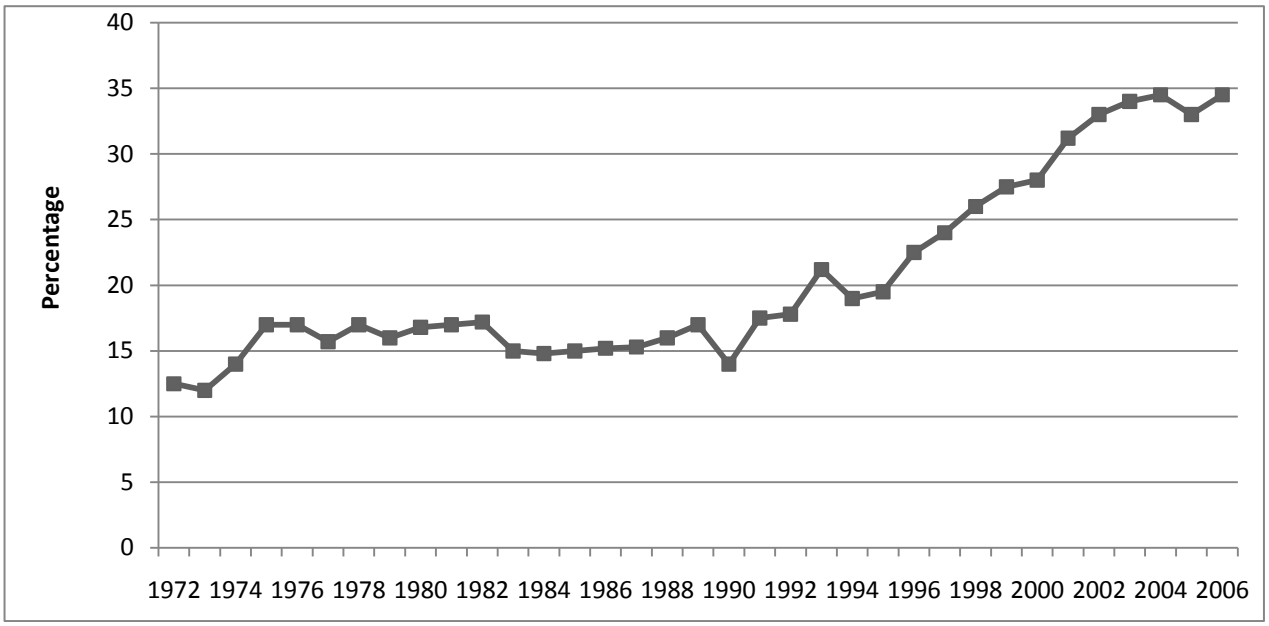
Following reunification, a tremendous increase in unemployment in Eastern Germany necessitated a huge financial transfusion from the German government in order to maintain unemployment insurance payments. Financial assistance was also used to encourage business and investment in order to stimulate employment. The findings in this study are confirmed in many recent studies on the relationship between unemployment rate and government expenditure. Fatás and Mihov (2001) conduct a study of OECD member nations and U.S. states and find that government spending has been used as a tool to mitigate the fluctuations of the business cycle and high unemployment rate.

The empirical results of this study also show a robust and positive relationship between the

unemployment rate and social security spending with a higher level of significance after reunification (β_{before}=13.26, p<.015; β_{after}=15.25, p<.000).

A good explanation for this result is that the federal government had to expand its system for compensating unemployed people as their number rapidly increased following reunification. In their study of Germany's federal subsidies for pension and unemployment insurance funds, Streeck and Trampusch (2005) indicate that reunification led to a spike in social welfare spending. As seen in Figure 5-7, the ratio of federal subsidies for social security to total spending rapidly increased after reunification and amounted to 35% of the total federal expenditure in 2006.

Figure 5.7. Federal Subsidies to the Social Security as a Percentage of Federal Spending



Source: Ministry of Finance in Germany

Unemployment rate and spending on economic services also shows a positive and significant result for overall and after reunification periods ($\beta_{overall}$=15.99, p<.000; β_{after}=24.78, p<.000). When West and East Germany were reunited, the East received investments meant to help modernize both the manufacturing and service sectors of its economy and to ensure employment. Substantial amounts of fiscal stimulus came from Western to Eastern Germany, resulting in higher per capita

economic services spending in the East after reunification. This indicates that differences between the West and East in terms of the development of various economic sectors pressured the government to stimulate aggregate demand and to adopt automatic stabilizers (Siebert 2004).[22]

As seen in the case of German reunification, the relationship between unemployment rate and government expenditure becomes stronger during periods of social disturbance compared to normal times because distortion of the labor market imposes financial burden on the government (Burda and Hunt 2001; Hunt 2006). High non-wage labor costs coupled with high level of contribution rates of social security funds interact with unemployment in a vicious circle. Increased contribution rates of employees to social security funds in order to pay for benefit of increasing unemployed people and pensioners make labor more expensive. As a result, they induce firms to downsize their labor forces, typically through early retirement, reducing employment even more and making addition government spending necessary to resolve the unemployment problem (Streeck and Trampusch 2005).

In the case of a social disturbance, a certain degree of labor market distortion is probably unavoidable. Unless government spending stimulates employment, labor market deterioration will increase the government's fiscal burden. Therefore, the most important task is to minimize labor market distortion in order to reduce the fiscal burden by distributing government expenditure to productive sectors for generating more employments.

[22] This kind of expansionary fiscal policy, implemented mainly as a remedy for high unemployment rates, can be also found in the case of the Great Depression (De Long 1998; Romer 2009).

Openness of the Economy

Table 5.6. Relationship of Openness of Economy to Government Expenditure

Openness of Economy (%)	Overall (1972-2006)		Before Reunification (1972-1990)		After Reunification (1991-2006)	
Per Capita Total Spending						
Coefficient	526.29620	***	601.72680	***	1144.72300	***
Std. Err.	(174.22390)		(156.20190)		(113.83090)	
Social Security						
Coefficient	203.17510	**	-18.67658		-209.30460	**
Std. Err.	(94.64894)		(99.31549)		(78.60564)	
Education						
Coefficient	-168.95430	***	-148.59240		-91.50895	
Std. Err.	(48.75200)		(84.36046)		(88.05798)	
Economic Services						
Coefficient	30.91750		-104.29110	**	135.69230	*
Std. Err.	(59.23146)		(35.89685)		(67.21529)	
Health						
Coefficient	-55.16636		9.47227		-96.72371	
Std. Err.	(31.64691)		(29.53310)		(74.28296)	
Public Safety						
Coefficient	-88.58479	***	-27.48219		-83.03895	**
Std. Err.	(12.28385)		(28.07583)		(28.93782)	
Defense						
Coefficient	-43.96156	***	-33.75418	***	11.61330	
Std. Err.	(7.41699)		(9.17523)		(10.74519)	

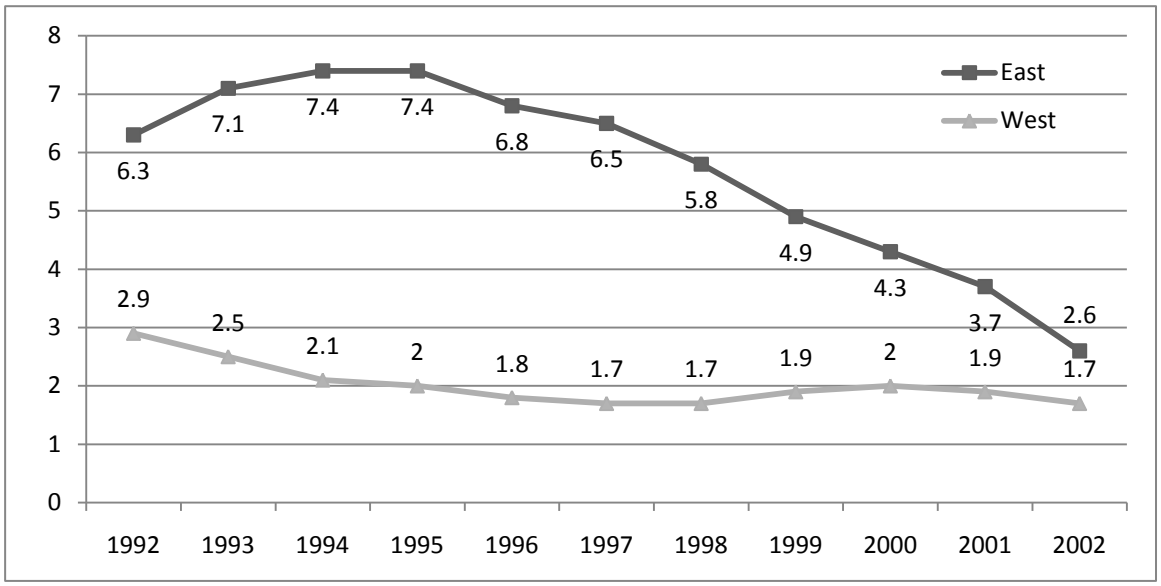
Note: ***p<0.01, **p<0.05, *p<0.10

In general, the openness of the economy is positively related to the growth of total German governmental spending, demonstrating that the compensation effect overshadowed the efficiency effect ($\beta_{overall}$=526.29, p<.008). Of note is the fact that following reunification, the government increased more expenditures as a way of countering the negative effects of economic openness than before reunification (β_{before}=601.72, p<.003; β_{after}=1144.72, p<.000). The openness of the economy in the former East Germany increased due to transition of the region from an economy planned and protected by the government to a market-based and globally open economy. The government increased public spending to insure citizens against the increased economic inequality and insecurity spurred by globalization.

However, it seems that the German government increased expenditure with the goal of intensifying international competitiveness and infrastructure development, rather than shifting expenditure to consumption areas such as social security, education, and health. This can be seen in the fact that the positive and statistically significant relationship with economic openness is found only in economic services spending following reunification (β_{after}=135.69, p<.061). The change in direction of the coefficient from negative before reunification (β_{before}=-104.29, p<.014) to positive after reunification reflects the prioritization of the East German economy, which received an influx of government spending that allowed the region to better prepare for free market conditions.

Data collected by Chandra (1996) indicates that immediately after reunification approximately 40% of Eastern Germany's productive infrastructure had no potential of being viable. Fear and Ketels (2006) present evidence that, at the time of reunification, the productivity of East German workers was just 50% of that of their counterparts in the West. To remedy this situation, large public investments were made in the East companies' energy and water infrastructure, sewage treatment centers, transportation networks, and telecommunications. Other studies on the relationship between public funding and R&D (Research and Development) have concluded that Eastern Germany received two to six times more funding than Western Germany (Almus and Czarnitzki 2003).

Figure 5.8. Percentage Change in Capital Stocks (1992 – 2002)



Source: Federal Statistical Office and statistics offices of the Länder
(Statistische Ämter des Bundes und der Länder)

The greater investment in Eastern Germany is reflected in the fact that the region received 66% of total German economic services spending after reunification. This effort resulted in the growth of capital stock in Eastern Germany during the period from 1992 to 2002, as can be seen Figure 5-8. However, interestingly, after reunification the relationship between economic openness and social security spending is negative and statistically significant (β_{after}=-209.30, p<.017), implying that the increase in social security spending after reunification is more closely linked to high non-wage labor costs and unemployment than to economic openness.

As can be inferred from the analysis of German reunification, for total spending there seems to be evidence in favor of the compensation hypothesis, but there are important differences among sub-policy spending categories. When a country like Germany with a high level of economic openness experiences an economic shock or social upheaval, the proportion of economic services

spending dedicated to improve the competitiveness of industries will increase, since international trading may be the most important potential source of economic growth in the country. On the other hand, expenditures in health, social security, and education are exposed to downward pressures when trade flow increases. The government may compensate less for economic insecurity and inequality by increasing consumption spending since the country has already adapted to a high level of economic openness and will not have many people in need of government compensation.

5.2.2. Political Determinants

Right Party Control

Table 5.7. Relationship of Right Party Control to Government Expenditure

Right Party Control	Overall (1972-2006)	Before Reunification (1972-1990)	After Reunification (1991-2006)
Per Capita Total Spending			
Coefficient	183.33440 **	281.74490 ***	2.72053
Std. Err.	(82.10218)	(54.40124)	(47.58931)
Social Security			
Coefficient	66.82223	190.61560 ***	-134.34140 ***
Std. Err.	(63.42679)	(45.50415)	(16.91217)
Education			
Coefficient	9.37334	-9.24926	26.19669 ***
Std. Err.	(7.50649)	(10.44993)	(6.77019)
Economic Services			
Coefficient	68.88451 ***	66.61105 ***	85.98227 ***
Std. Err.	(18.29328)	(6.42021)	(20.28859)
Health			
Coefficient	-3.17653	1.86708	-10.05921
Std. Err.	(8.13500)	(6.00449)	(10.32524)
Public Safety			
Coefficient	17.35462 **	-1.92126	11.96081 **
Std. Err.	(5.99109)	(4.07838)	(4.52690)
Defense			
Coefficient	8.25504 **	18.16797 ***	10.50454 *
Std. Err.	(3.68566)	(4.14346)	(5.26820)

Note: ***p<0.01, **p<0.05, *p<0.10

Party control theory claims that progressive (or ideologically left) parties are expected to

increase government expenditure because they represent low-income people who favor a bigger role for government in society.

In Germany, the empirical results do not confirm the party control theory for per capita total spending. The coefficient of 'right party control' is found to be positive and statistically significant in the overall period ($\beta_{overall}$=183.33, p<.040), as well as before reunification (β_{before}=281.74, p<.000). In fact, right-wing parties have been striving to increase government spending during the phase of welfare state expansion in Germany. Pierson (2001) argues that right-wing parties strategically adopt pro-welfare policies in order to attract voters. In line with this argument, Huber and Stephen (2001) find that the Christian Democratic Party increased government spending on programs such as unemployment benefits between 1960 and 1985.

However, the empirical results in this study show that party control is no longer relevant to total per capita spending after reunification (β_{after}=2.72, p<.955). It is plausible that economic struggles during the post-reunification period may generate socio-economic issues; examples include high unemployment rates in the former East German states, the growing number of retiring people who demand pension spending, and the social conflicts generated during the process of reunification. Political parties might try to respond to these socio-economic demands regardless of party ideology, suggesting that party control theory would not hold after reunification.

On the other hand, evidence for the effect of party control theory can be found in social security spending. Empirical evidence shows that the coefficient is robust and positive before reunification (β_{before}=190.61, p<.002). It has been argued that high social welfare spending was very popular with the German electorate and any cuts to social expenditures would have been politically unwise. In fact, before reunification, the right-leaning Kohl administration was only able to reduce social expenditures very slightly. After reunification, however, enormous monetary transfers from

the West to the East made welfare expenditure unpopular in the West and turned public opinion in favor of social spending cuts. The empirical results confirm this, showing a negative relationship between the right party control and social security spending after reunification (β_{after}=-134.34, p<.000). In addition to a huge fiscal burden accompanied by a growing budget deficit, an unsustainable social system compounded by a high unemployment rate and a growing number of pensioners forced the right-wing government to reduce social security spending.

When it comes to spending on economic services, empirical results consistently show positive and robust coefficients for all three time periods ($\beta_{overall}$=68.88, p<.002; β_{before}=66.61, p<.000; β_{after}=85.98, p<.001). It is particularly worthwhile to focus on the increase of the coefficient after reunification (β_{before}=66.61, p<.000; β_{after}=85.98, p<.001). In the course of economic integration, industries in the East were found to be unable to compete with either their counterparts in the West or international capital markets. Therefore, parties that controlled the government and implemented economic policies, regardless of their position on the political spectrum, were forced to focus on economic services and to increase spending on industrial development.

Meanwhile, the predictions of party control theory are confirmed in defense spending. Defense spending shows a positive relationship with the right party control ($\beta_{overall}$=8.25, p<.040; β_{before}=18.16, p<.001; β_{after}=10.50, p<.063). These results indicate that right-wing parties increase defense spending, but the decrease in the coefficient after reunification is noteworthy. Considering that reunification negotiations required dramatic reductions of spending on defense personnel and equipment, the observed drop in the value of the coefficient after reunification is understandable (Merrath 2000).

Generally, when faced with social disturbance, overall government spending will need to increase in response to urgent socio-economic issues. Accordingly, the government would converge

to support expenditure growth regardless of party ideology, implying that party control theory would not be clearly confirmed during difficult times of social disturbance. However, when a social disturbance increases the fiscal burden of government, political parties are likely to diverge, particularly with regard to social security spending because it makes up a majority of total spending and adds to the fiscal burden.

Election (Political Business Cycle)

Table 5.8. Relationship of Election to Government Expenditure

Election	Overall (1972-2006)	Before Reunification (1972-1990)	After Reunification (1991-2006)
Per Capita Total Spending			
Coefficient	33.34977	54.42797	39.45354
Std. Err.	(48.83786)	(48.77429)	(41.71878)
Social Security			
Coefficient	-0.83369	-5.16970	21.25253 *
Std. Err.	(42.89964)	(45.75530)	(12.09192)
Education			
Coefficient	10.68628	19.37746	-0.77116
Std. Err.	(10.25979)	(13.25162)	(10.21149)
Economic Services			
Coefficient	5.68814	14.30036	2.93302
Std. Err.	(11.50529)	(10.39444)	(17.33256)
Health			
Coefficient	-0.00022	10.15373	-7.61857
Std. Err.	(11.95277)	(7.35941)	(16.73298)
Public Safety			
Coefficient	6.31834	6.46154	4.66640
Std. Err.	(5.06907)	(4.29055)	(4.29887)
Defense			
Coefficient	-3.18835	-3.81095	-3.66783
Std. Err.	(2.59277)	(4.76604)	(2.48238)

Note: ***p<0.01, **p<0.05, *p<0.10

In Germany, the political business cycle is not found to have any effect on total expenditure or on spending in any sub-policy area. The coefficients of the election variable in total spending and most sub-policy spending areas for the overall period are positive but not statically significant

($\beta_{overall}$=33.34, p<.504). Interestingly, the coefficient found in relation to total spending decreases from the time before reunification (β_{before}=54.42, p<.288) to after reunification (β_{after}=39.45, p<.358). This seems to be a common occurrence among certain sub-policies, notably education, economic services, health, public safety, and defense spending. Meanwhile, the coefficient of the 'election' variable is positive and significant only in social security spending after reunification (β_{before}=-5.16, p<.912; β_{after}=21.25, p<.098). These results indicate that election years do not affect government spending.

This result is similar to the findings of other studies, which have not found the political business cycle to be present in Germany at the federal level (Berger and Woitek 1997), or at the state level (Seitz 2000). This result is similar to the findings of other studies, which have not found the political business cycle to be present in Germany at the federal level (Berger and Woitek 1997), or at the state level (Seitz 2000). Furthermore, Kitschelt and Streeck (2003) suggests that both the CDU/CSU as well as the SDP parties needed to balance reform ambitions, which were popular in the western part of the country, with the defense of social rights, a priority for the electorate in the East. Consequently, it is likely that the fiscal policies of both parties converged following reunification, undermining the notion of a political business cycle. However, there are other studies that have shown the presence of a political business cycle in Germany (Frey and Schneider 1979; Alesina et al. 1992).

The absence of a political business cycle in Germany may be due to several unique German factors. First off, because Germany's government is a parliamentary system, government expenditure policies are generally decided after elections when negotiations between parties take place. Also worthy of note is that before reunification the right had a political dominance in Germany's *Länder* and in the national government, as shown by Alesina and Roubini (1992). The low level of electoral

competition contributed to the absence of political business cycles. After reunification, social and economic conditions were such that electoral competition was not a primary concern; instead, the amelioration of socio-economic conditions and dealing with after-effects of reunification had a greater impact on government expenditure (Müller 2009).

Coalition Government

Table 5.9. Relationship of Coalition Government to Government Expenditure

Coalition Government	Overall (1972-2006)	Before Reunification (1972-1990)	After Reunification (1991-2006)
Per Capita Total Spending			
Coefficient	109.63370 **	73.30558	182.61230 ***
Std. Err.	(46.19143)	(71.41285)	(48.79994)
Social Security			
Coefficient	-17.87603	33.85956	20.93937
Std. Err.	(13.49382)	(24.53335)	(12.87084)
Education			
Coefficient	2.39901	4.41898	-26.48382 ***
Std. Err.	(6.26621)	(9.86519)	(6.13703)
Economic Services			
Coefficient	34.53314 ***	7.32063	36.63765 ***
Std. Err.	(11.36891)	(14.37304)	(11.24925)
Health			
Coefficient	-11.55913	-12.25663	-12.75911
Std. Err.	(9.26164)	(8.93059)	(12.03263)
Public Safety			
Coefficient	19.70939 ***	7.81229	22.03861 ***
Std. Err.	(4.83405)	(5.24109)	(4.67869)
Defense			
Coefficient	-2.32489	-5.35467	-2.19351
Std. Err.	(2.28548)	(3.68241)	(2.20408)

Note: ***p<0.01, **p<0.05, *p<0.10

Coalition governments in Germany seem to have positively affected overall government expenditure growth. The coefficient of the relationship between coalition governments and total spending was found to be positive and statistically significant between 1972 and 2006 ($\beta_{overall}$= 109.63, p<.030). The coefficient changed from positive but not statistically significant before

reunification to statistically significant after reunification (β_{after}=182.61, p<.002). These results are understandably sound considering the unique German political landscape. After reunification, coalition governments have been formed in 147 years out of 267 observation years, amid the trend of steady increase in government expenditure at both federal and state levels. In addition, the federal government is always ruled by a coalition, and state governments are heavily influenced by the national party platforms about their programmatic orientations (Müller 2009). Moreover, in difficult times after reunification, reducing the size of expenditures or avoiding an increase in government expenditure is more difficult, since coalition partners must meet the urgent needs of their supporters who are suffering from the shock of reunification.

These results are similar to the findings of previous studies that have also found the existence of coalition governments to have a positive effect on government deficits and thus government spending, particularly in other OECD countries (De Haan et al.1999; Volkerink and de Haan 2001; Perotti and Kontopoulos 1998). Likewise, Bawn and Rosenbluth's (2006) analysis of public spending in 17 West European countries from 1970 to 1998 finds a positive relationship.

Coalition governments are also found to have a significant and positive influence on economic services and public safety spending. In both sub-policies, the coefficient is positive yet not statistically significant before reunification, but after reunification the coefficient is both positive and statistically significant. It may be that after reunification, regardless of each party's ideology, coalition governments might try to respond to immediate needs to modernize the former East Germany and many of its industries as well as cope with higher crime rates and increase in the number of lawsuits as a result of high unemployment rates and internal immigration (Albrecht 1997).

Interestingly, the existence of coalition governments had no effect on governmental spending on social security and health after reunification. It seems that the number of CDU-led

coalitions and socially conservative coalitions including the FDP had less interest in increasing social protection programs was greater than the number of coalitions led by left-wing parties.

The existence of coalition governments seem to have different relationships with total spending and some sub-policy spending categories depending on socio-economic situations and the degree of ideological distance among parties in coalition governments. In normal times, when the government is able to handle the fiscal condition of either surplus or deficit, single-party governments are apt to modify the budget according to the current fiscal condition. This enables them to increase or decrease spending more flexibly. On the contrary, coalition governments find it difficult not only to decrease spending under difficult fiscal conditions but also to increase it even under a more favorable context, because each member of the coalition has a veto power. During social disturbances, particularly, coalition governments are less willing or able to resist pressures for more spending to address serious socio-economic needs even under difficult fiscal conditions.

5.2.3. Institutional Determinants

Bureau Voting

Table 5.10. Relationship of Public Employees to Government Expenditure

Public Employees (%)	Overall (1972-2006)		Before Reunification (1972-1990)		After Reunification (1991-2006)	
Per Capita Total Spending						
Coefficient	328.30560	***	473.84230	***	252.15440	***
Std. Err.	(23.75214)		(56.97547)		(22.98154)	
Social Security						
Coefficient	34.81881	***	24.68536	*	33.27761	**
Std. Err.	(8.36116)		(13.32326)		(11.39607)	
Education						
Coefficient	52.81288	***	55.53822	***	32.49155	***
Std. Err.	(4.43932)		(10.74569)		(5.86035)	
Economic Services						
Coefficient	54.30066	***	2.62319		80.55737	***
Std. Err.	(12.93622)		(19.39162)		(10.70297)	
Health						
Coefficient	98.59796	***	96.36265	***	90.74965	***
Std. Err.	(11.11144)		(10.62114)		(13.20687)	
Public Safety						
Coefficient	-12.99033	**	36.63483	***	-15.39980	***
Std. Err.	(5.31266)		(3.53150)		(3.95969)	
Defense						
Coefficient	11.26926	***	11.66210	***	3.13147	
Std. Err.	(1.54369)		(3.01932)		(2.13527)	

Note: ***p<0.01, **p<0.05, *p<0.10

The empirical results are consistent with the bureau voting model in that the proportion of public employees in the labor force is positively associated with overall expenditure and with spending in most of the sub-policy categories. The per capita total expenditure is positively related with the portion of the public employee throughout every period of interest ($\beta_{overall}$=328.30, p<.000; β_{before}=473.84, p<.000; β_{after}=252.15, p<.000). Such a constant positive relationship between public employment and total government spending – even after reunification – meets the expectation of the bureau voting model. However, the value of the coefficient after reunification becomes smaller for total spending. This is explained by the fact that after reunification the number of public

employees decreased in both absolute and relative terms, as a single unified administrative structure absorbed both Western and Eastern public employees.

On the other hand, the proportion of public employees in the labor force is found to have a stronger positive influence on social security and economic services spending after reunification. For social security spending, the coefficient value increases after reunification (β_{before}=24.68, p<.091; β_{after}=33.27, p<.010). Similar evidence is also found in economic services spending (β_{before}=2.62, p<.895; β_{after}=80.55, p<.000).

These results confirm the expected fiscal changes immediately after German reunification. That is, reunification causes the expansion of critical social-economic policy sectors (social security and economic services) in order to achieve a smooth transition through social and economic stabilization. As more public employees are hired in such vital sectors, they may support increased spending in these areas in order to secure their power or political gains. Those critical sub-policy sectors are presumed to increase the need to hire public workers, reinforcing the political influence and support for higher government spending among the bureaucratic labor force. At the same time, as reunification exerted tremendous pressure on government spending, especially in the areas of social security and economic services, the overall impacts on other sub-policy sectors like education, health, and public safety may become relatively weaker or negative.

From this analysis, it may be argued that when social disturbance occurs, government involvement and spending in some important sub-policy sectors is expected to increase. As a result, the influence of public employees in such sub-policy sectors is reinforced and further expanded.

Fiscal Illusion

Indirect Tax Ratio

Table 5.11. Relationship of Indirect Tax Ratio to Government Expenditure

Indirect Tax Ratio (%)	Overall (1972-2006)	Before Reunification (1972-1990)	After Reunification (1991-2006)
Per Capita Total Spending			
Coefficient	-0.02324	-1.12478	-1.51116
Std. Err.	(3.19886)	(4.96106)	(2.73093)
Social Security			
Coefficient	-2.09113	-0.82415	-2.99900 ***
Std. Err.	(1.42517)	(2.93737)	(0.63759)
Education			
Coefficient	-1.83733 **	0.73646	-0.26894
Std. Err.	(0.77847)	(1.83807)	(0.47436)
Economic Services			
Coefficient	0.22227	-2.11962	0.81029
Std. Err.	(0.75861)	(2.07141)	(0.90192)
Health			
Coefficient	-3.10232 ***	-4.65165 ***	-0.94463
Std. Err.	(0.90976)	(1.25027)	(0.99252)
Public Safety			
Coefficient	1.00355 ***	1.08637	0.90216 ***
Std. Err.	(0.32246)	(0.68168)	(0.29250)
Defense			
Coefficient	-0.23646	-0.81572 **	-0.01493
Std. Err.	(0.13974)	(0.27870)	(0.14638)

Note: ***p<0.01, **p<0.05, *p<0.10

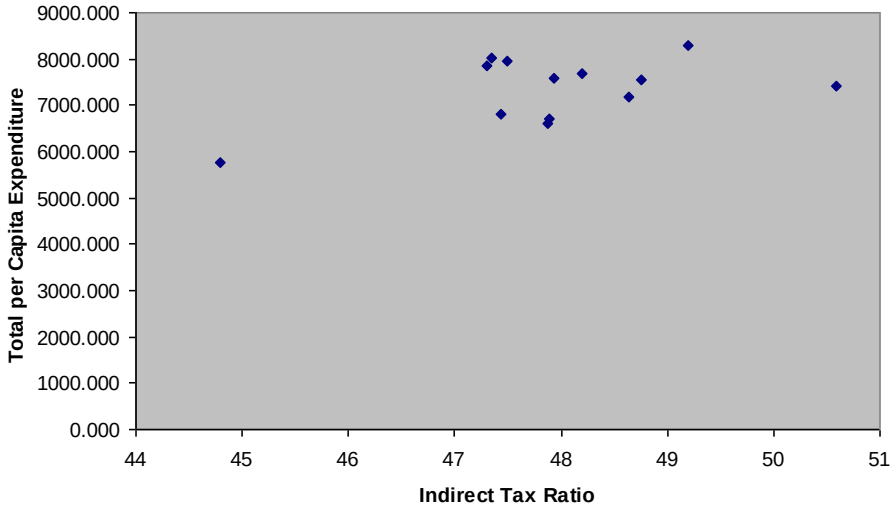
Although the theory of fiscal illusion suggests that taxpayers demand greater government expenditure since they fail to realize that indirect taxes increase their tax burden, the relationship between the ratio of indirect tax to total taxes and government expenditure does not generally support this hypothesis.

The only relationship which meets the theoretical expectation can be found between the indirect tax ratio and public safety spending. The coefficient value of the indirect tax ratio is positive and significant for the overall period and after unification ($\beta_{overall}$= 1.00, p<.007; β_{after}= 0.9021, p<.007). This result shows that an increase of the indirect tax ratio leads to greater public

safety spending after reunification.

On the other hand, the coefficients of the indirect tax ratio are mostly not significant and have negative signs. After reunification, the German government was incapable of utilizing its tax system, so tax revenue, (from both direct and indirect taxes) remained far below expectations. That is, tax revenue was not a major instrument upon which the German government could rely to fund its increased spending after reunification. The scatter plot of the relationship between total per capita spending and the indirect tax ratio (after reunification) might support this argument. As seen in Figure 5-9, the relationship is very weak, and even if there happens to be a linear trend, the change in indirect tax ratio does not contribute much. Thus, the German government must have adopted some other methods to support its increased spending.

Figure 5.9. Scatter Plot of the Relationship between Total Spending and the Indirect Tax Ratio



In fact, after reunification, a relatively more effective way to finance the spending proved to be lump-sum contributions, such as a unification fund. Because it is transparent and straightforward, a unification fund was considered to be a more pragmatic means to secure funding for social welfare spending.

Budget Deficit Ratio

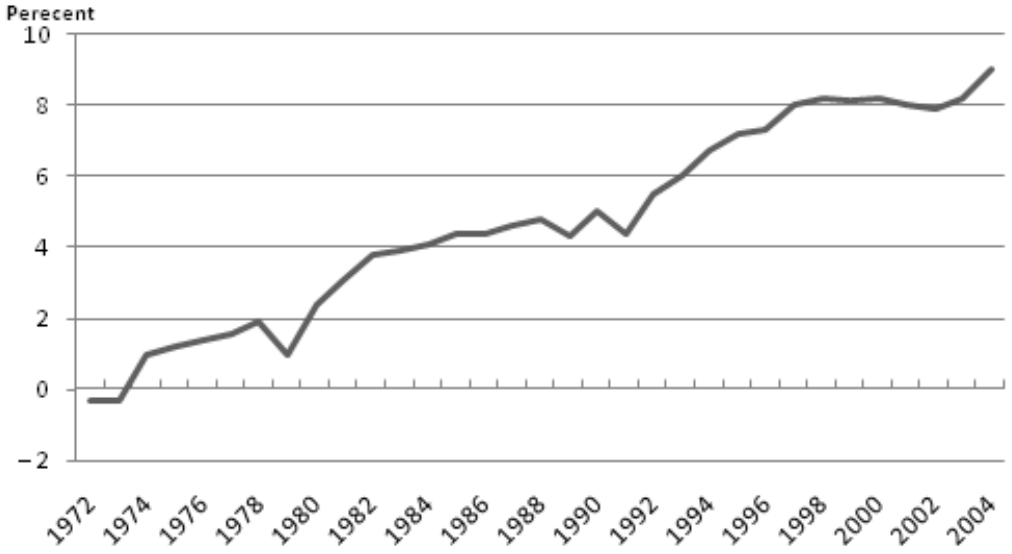
Table 5.12. Relationship of Deficit Ratio to Government Expenditure

Deficit Ratio (%)	Overall (1972-2006)	Before Reunification (1972-1990)	After Reunification (1991-2006)
Per Capita Total Spending			
Coefficient	9.15980 **	-4.05433	15.22733 ***
Std. Err.	(3.89259)	(4.89709)	(4.32511)
Social Security			
Coefficient	7.50866 **	6.22562	1.60094
Std. Err.	(2.79782)	(3.88977)	(1.21379)
Education			
Coefficient	-0.41555	-3.56295 **	1.44479
Std. Err.	(0.81877)	(1.22032)	(0.92475)
Economic Services			
Coefficient	-0.29050	-1.72946	2.20578
Std. Err.	(1.17806)	(1.02137)	(1.75894)
Health			
Coefficient	-3.83599 ***	-2.64308 ***	-6.88764 ***
Std. Err.	(1.07127)	(0.68216)	(1.70131)
Public Safety			
Coefficient	0.67810	-1.51936 ***	2.31445 **
Std. Err.	(0.78533)	(0.30228)	(0.97956)
Defense			
Coefficient	-0.03241	0.89954 **	-0.82866 ***
Std. Err.	(0.29246)	(0.32245)	(0.23395)

Note: ***p<0.01, **p<0.05, *p<0.10

This study finds that the deficit ratio has a significant effect on total per capita spending, especially after reunification. While the relationship is not significant before reunification, the coefficient of the 'deficit ratio' variable is statistically significant after reunification (β_{before}=-4.05, p<.425; β_{after}=15.22, p<.003). This indicates that, as seen in Figure 5-11, the high level of debt after reunification is closely related to an increase in the overall level of public spending. However, the effect of the deficit ratio on most sub-policy spending areas was weaker than what was expected. Nevertheless, some important implications can be found.

Figure 5.10. Ratio of Debt to GDP (1972-2004)



Source: Federal Statistical Office of Germany

First, the deficit ratio has a significant impact on social security spending in the overall period ($\beta_{overall}$=7.50, p<.016). This implies that government's debt financing, regardless of the social disturbance like reunification, continues to be used for social policies. Since the burden of social protection programs has persistently been shouldered by the German government, budget-deficit is more likely to occur.

The relationship between per capita health expenditure and the deficit ratio also reflects the unique characteristics of the German health system. The coefficients of the deficit ratio for every period of interest are negative and statistically significant at the 1% level. The reason for such relationships is that the German health system does not rely on governmental intervention; financing is attained primarily through contributions. Moreover, the governments at the state level reduced health spending. The direction of the relationship between deficit ratio and per capita defense spending changed from positive before reunification to negative after unification.

(β_{before}=.8995, p<.018; β_{after}=-.8286, p<.003). This reflects the fact that before reunification, the German government used debt financing in order to reinforce its defense capability against East Germany. However, as the result shows, German reunification made increases in military spending meaningless, and the government instead began to focus on spending related to rapid social stabilization.

An important implication can be drawn from this analysis. When social disturbance such as reunification between the states occurs, where levels of economic standing are clearly different, overall government expenditure is likely to increase in order to accomplish the prompt reconstruction of the country. As the overall expenditure level increases, it is to be expected that the budget deficit will also increase. Thus, it is desirable that the government always prepare for effective fiscal policy in order to sustain the growing pressure on spending when such a social disturbance takes place.

5.3. Expenditure-Revenue Nexus and Fiscal Decentralization

As described in Chapter 4, a slight increasing trend of centralization after reunification can be seen in the traditional Expenditure Ratio. On the other hand, analysis of the Composite Ratio reflecting both the expenditure and revenue sides of governmental finance reveals that greater fiscal centralization took place. In addition, fiscal authority was most centralized during the 1996-2000 period when both the Expenditure Ratio and the Composite Ratio reached their lowest average value.

This noticeable change may derive from the fact that in 1995 the German fiscal system was reformed to integrate the states of the former East Germany fully into the *Länderfinanzausgleich*

(LFA), a fiscal equalization mechanism.[23] In general, it has been argued that the German system tends to be decentralized on the expenditure side with state governments assuming more responsibility for provision of public services. Conversely, the system is highly centralized on the revenue side; the bulk of revenues are collected as common taxes with proscribed allocation between the orders of government that are subject to federal legislation, albeit usually requiring the consent of the *Bundesrat* representing the states (Watts and Hobson 2000).

Under this system, the constitutionally mandated sharing of the main tax revenues between the federal government and state governments is combined with a variety of intergovernmental transfers that result in a complex set of fiscal relations at the different levels of government. The German fiscal equalization system includes both vertical and horizontal transfers. In addition to an interstate revenue pool into which wealthier *Länder* pay and from which poorer *Länder* draw according to specified criteria and a set formula, there are federal supplementary payments made to the poorer *Länder* based on a fixed percentage of the value added tax (VAT). Since reunification, the federal government has granted states a greater share of these "shared taxes" primarily to assist poor Eastern states.

In this regard, Hepp and Von Hagen (2001) examine the redistributive and stabilizing properties of the federal fiscal system and find a significant increase in the impact of federal supplementary grants on some states revenues. They find that the degree of redistribution among West German states increased by about 18 percent when comparing the periods before and after reunification, a finding attributed primarily to the effect of federal grants at the last stage of LFA. In addition, their results show that fiscal equalization eliminated 68 percent of the differences in per

[23] This system is based on the uniformity-of-living-conditions principle (Hepp and Von Hagen 2001).

capita tax revenues among the governments of former East German states. Again, federal transfers were a significant factor in the equalization process.

In addition to contributing to fiscal equalization, the federal government also makes special earmarked payments to the states. The 1991 federal budget alone earmarked over DM 90 billion for payments to the East for social security, infrastructure investment, and many other items (Gann 1992). Federal bailouts for East German states from a special fund were also unavoidable following reunification.

However, the LFA system did not sit well with some of the Western states. The rich *Lander* felt overburdened by the central government and the task of financing poor regions. As a result, officials in some of the richer Western states began to advocate in favor of a more decentralized fiscal federalism system. Their claims did not gain much traction since poor Western states allied with their Eastern counterparts to keep the current system of centralization in place.

Moreover, in the analysis of the structure of taxes in Germany, Seitz (2007) finds that at the federal and local level, about 40% of tax revenues are from own resources, whereas at the state level the ratio is only about 15% in 2004.

Considering the role played by the federal government in the LFA, the amount of sub-national governments' expenditure that is financed by intergovernmental grants and revenue-sharing programs will clearly impact the level of fiscal authority. Consequently, the traditional Expenditure Ratio and Revenue Ratio overestimate the true extent of sub-national spending or taxing autonomy, respectively. The reason for this is that the central government may influence sub-national decisions through intergovernmental transfers and mandates to state and local governments. The Expenditure Ratio considers these as sub-national expenditures even though sub-national governments may not have autonomy in these spending decisions or be spending directly on behalf

of central government orders.

Therefore, a Composite Ratio that accounts for both the expenditure and revenue sides of public finance will be a more accurate indicator of changes in fiscal authority. This is particularly important in the case of a social disturbance. In the event of a social "shock," it is likely that local governments will be under significant duress and require fiscal support from the central government. In particular, local and state governments may lack the authority to collect revenue or to raise additional revenue needed to finance public services. Therefore, states are reliant on the federal government if a major social disturbance occurs. This aspect is completely overlooked when interpreting the Expenditure Ratio; thus, the trend towards fiscal centralization is underestimated. Specifically, in Germany, the average Expenditure Ratio declines by 6.89% after reunification, whereas the composite ratio declines by 12.60%. Moreover, consideration of the revenue side and the expenditure side simultaneously is essential to capture the effects of intergovernmental transfers and federal tax revenue sharing.

Nevertheless, the composite ratio can only be calculated for total spending, since a breakdown of revenue by sub-policy is not readily available. In future studies, linking the intergovernmental transfers to sub-policy spending will allow for fiscal authority change within functional budget categories to be more fully explored.

5.4. Implications for Public Administration and Policy

Persistent Growth of Government and Bureaucracy

The finding of a large increase in governmental expenditure during and after crisis periods implies that governments are likely to extend their control over the market economy (even to the point of taking full control of markets) as a result of social disturbance. At the outbreak of a

disturbance, a sudden increase in the demand for public goods and services leads immediately to governmental intervention in society, and shifts resources to allow for greater government expenditure as well as tighter regulation of markets.

In addition, during such crises, there is little opportunity for a meaningful democratic vote on extending state powers; instead, there is likely to be an insistent public demand for emergency action of some sort and relatively little public consideration of the long-term costs of policy changes including regulation, controls, and inflationary financial practices (Higgs 1987). Hence, the public is more willing to support political proposals for enlarged governmental authority and activity.

The expansion of the government's power and authority during and after social disturbances may provide some insights into why government size has not contracted to the degree to which public administration theory has advocated.

Given that a government is not a single actor using a single resource, but a conglomerate of institutions producing heterogeneous outputs, the multiplicity of governmental activities and the greater need for interventionist policies may result in the reinforcement or expansion of bureaucratic authority over a variety of policies and areas of governance.

The events that took place in the aftermath of September 11, for instance, illustrate the reality that both the power to decide such wide-scale actions and the authority to mobilize resources to implement necessary measures have been grounded in the intensified bureaucratic institutions of the central government. The U.S. federal government took only ten days to allocate $40 billion for clean-up, disaster relief, and security measures; approve $15 billion in assistance to the distressed airline industry; and establish a cabinet-level Office of Homeland Security (Lake 2002).

More to the point, these changes may outlast the actual social disturbance. Although crises are temporary, increases in government expenditure and authority often persist long after the crises

have diminished. For example, due to the social and political realities that emerged out of the September 11 terrorist attacks, the heightened power and influence of the U.S. government in the national security sector do not seem to be weakening or weaning, despite the fact that the actual crisis has been resolved. In short, the more a country experiences social disturbances, the more likely it is that the governments have expanded their functions and expenditures accordingly and the less likely it will be for these changes to reverse or contract.

This finding is line with the argument of public policy theory that major changes in public spending and public policies are caused by external events that disrupt the political system. Policy analysts have labeled these external shocks as *focusing events* (Walgrave and Varone 2008). The characteristics of such events are that they occur suddenly, are unusual, and cause distress. The other significant characteristic of focusing events is that they are revealed to both the public and policy makers at the same time, catching both off guard. Thus, media coverage of focusing events tends to highlight the deficiencies of government policies to have detected such shocks, as well as the need for government action to address the imminent disorder and unrest. Governments may respond to these types of events by adding new policies or modifying previous policies, coupled with expansion of government expenditures and authorities.

Policy Development and Changes in Governmental Expenditure Composition

Social disturbances may impose new issues and problems on various socio-economic situations such as per capita GDP, labor movement, unemployment rate, and pensioners. In addition, political and institutional tensions are likely to increase, which may lead changes in budget institutions' response to such socio-economic hardships. Social disturbances also bring about the creation of new government programs, changes in the role of government, and changes in popular

thinking.

As a result, the government will prioritize budgetary allocations based on need, urgency, and effectiveness, while factoring the impact of a variety of determinants on public policies and spending into the equation. This will bring about noticeable changes in the composition of governmental expenditures.

In the course of this change, social disturbances also afford the government greater discretion to establish new programs that would have been difficult to implement, or which would have faced long delays, during non-crisis periods. For example, in response to the current unprecedented global economic recession, the government of the United States has spent one trillion dollars bailing out banks, exercising exceptionally heavy supervision over the financial industry, and making huge investments in the fields of alternative energy and bio-engineering. Larger budget allocations in these areas will produce substantial changes in the composition of governmental expenditures and in industry structures that would have been impossible without economic crisis. Thus, social disturbance may allow the government to intervene or to expand its role in areas where it could not have done so in normal times.

This finding may illuminate how certain policies or programs have been introduced or developed as a result of social disturbance. In addition, it can explain the variation in changes among various sub-policy spending categories as portions of the total budget. For example, because pensions and unemployment insurance are relatively money-intensive but require minimal resources in terms of organizations and personnel, spending on these programs is likely to increase significantly as total governmental expenditures grow. On the other hand, relatively labor-intensive education programs may make greater demands on organizations and public employees than on the budget. Economic infrastructure policies are likely to consistently claim a significant amount of

public resources, but their aggregate share of the total budget changes little under social disturbance. Conversely, large decreases in both spending and employment can be observed in defense programs (Rose 1985). Therefore, the characteristics of various programs may determine the extent to which any specific resources among organizations, personnel, spending, and laws and regulations may change in line with the transformation of public policies as a result of social disturbances.

Moreover, from a theoretical perspective, it is possible to compare different program categories both within individual nations and across multiple nations, to check for whether there are greater similarities within spending categories cross-nationally (e.g., education in Canada, Germany, and the United States) or between categories within a specific nation (e.g., defense, social security, and public safety in the U.S.) (Rose 1985). However, the most important comparison is between particular programs and aggregate governmental expenditure. This significance lies not within the size of the particular program in and of itself, but in the direction and rate of change against the aggregate. Therefore, comparison of the particular programs and government in aggregate can test whether the dynamics of government growth are the result of all programs changing in much the same way, or is the sum of some programs growing in size, others being downsized, and a third group showing little net change (Rose 1985, 10)

Administrative Authority of Central Governments

The occurrence of social disturbance also illustrates a reason why the roles of the central government are not undermined in public administration and policy. In times of crisis, it is expected that the central government will play a key role in policy formulation and implementation. The key motivation for a recentralization of policymaking during times of crisis is that the central government alone has the capacity to respond in an effective and meaningful way to relieve large-

scale social distress.

Non-national governments have limited capacity in key areas including funding, staff resources, administrative competence, political influence, and so forth. These constraints severely limit their ability to deliver program outputs, create tension between program delivery and institutional preservation, and undermine the power relationships and political regimes on which, in many cases, they depend for funding and political support.

Beneath all of these capacities and supports, central governments may initiate massive campaigns to define policy goals, articulate the need for such actions, and win public support for what could potentially be widely unpopular actions.

For example, the events of the September 11, 2001 galvanized a response in which central governments were the leading and, indeed, perhaps the only agents wielding sufficient rhetorical, political, and material resources to be capable of effective action. Likewise, the ability to undertake massive regulatory intervention after a financial crisis is a product of strong and wide-ranging administrative power at the federal level. This change may also continue for a considerable time after the crisis abates.

Moreover, this finding may offer a valuable insight into the differences in power and interventionism of central governments around the world, which may be relevant to the scope and frequency of social disturbance to some extent.

Chapter 6

Conclusion

This dissertation investigates changes in size, composition, and fiscal authority of government expenditure brought on by social disturbance by examining the effects of German reunification on government. Unlike past approaches which have tended to be narrow in scope, this study analyzes examines the impact of German reunification on government spending by comparing both the pre- and post-reunification periods.

The results from this analysis indicate that German reunification resulted in a displacement effect. Moreover, this study identifies different influences of major determinants on total spending as well as on functional budget categories in the pre- and post-reunification periods and answers the question whether or not reunification resulted in fiscal centralization.

6.1. Summary of Key Findings

To better understand changes in the size of the government's budget, this study conducts five different tests which have been used in existing literature. These tests demonstrate strong evidence of a large upward displacement effect following reunification which is strongly correlated with social security spending. Social disturbances result in unemployment and economic hardships, necessitating higher levels of social security spending which led to a rise in government expenditures.

Regarding the determinants of size and composition in government expenditure, this study finds that socio-economic factors seem to have eclipsed political disputes in the post-reunification period.

There is a positive and significant correlation between per capita GDP and total spending, social security spending, education spending, and public safety spending. This correlation confirms that Wagner's Law was in play following reunification. Data from this study indicates that there is a positive correlation between government spending and population density, which suggests that German reunification was followed by diseconomies of scale. A positive relationship with social security and education spending is also found. However, economic services spending turns out to have a significant but negative relationship with population density.

In terms of age composition, the proportions of the youth and elderly populations are negatively associated with total spending after reunification. However, the proportion of the youth population is positively associated with per capita education spending. The elderly population demonstrates a strong and negative relationship with health spending and a positive relationship with social security spending. These findings may suggest that public spending was not able to keep pace with the growing elderly population.

Data collected also supports the counter-cyclical policy theory. There is a correlation between unemployment rate and spending related to social security, education, economic services, and public safety during the pre- and post-reunification periods that is both positive and statistically significant. This suggests German governments had to resort to extreme fiscal measures in order to respond to unemployment problems brought on by reunification. Rising levels of social insurance in Germany may have led to low labor participation, reinforcing such positive correlations.

The correlation between government spending and economic openness grew more positive in the post-reunification period, reflecting an expansion of public spending in order to counter the rise of economic insecurity and inequality in East Germany. While there is a correlation between economic openness and spending related to social security, education, and health care that was both

negative and statistically significant, there is a positive correlation between economic services and economic openness following reunification. These findings suggest that greater economic openness resulted in a rise in government spending, which consisted of productive spending rather than consumption spending.

Of political determinants, this study finds that there is no significant correlation between total spending and right party control. There is a correlation between right party control and spending on education, economic services, public safety, and defense that is both positive and statistically significant. There is, however, a correlation between the right party and social security spending that is both negative and statistically significant. This suggests that reunification resulted in higher government spending in all German states, regardless of the political ideology. It also indicates that right parties have a tendency to cut social security spending when confronted by the problem of increases in the government's fiscal burden.

With the exception of an observable positive correlation with social security in the post-reunification period, elections have no significant effect on sub-policy spending. Due perhaps to either factors related to the German parliamentary system or a lack of electoral competition, there is no evidence to support the idea of the political business cycle.

This study indicates that there is a positive and statistically significant correlation between the coalition government and both total spending and sub-policy spending, which included spending on economic services and public safety in the post-reunification period. As coalition governments tend to dominate the political scene in Germany, it is understandable that the social changes brought about by reunification would lead to increases in public spending.

There is a positive and highly statistically significant correlation between the portion of public employees in the population and spending on social security, education, and economic

services. This is consistent with the bureau voting model. Particularly, the finding suggests that the public employees in social security and economic service sectors have gained greater authority and discretion in the post-reunification period, contributing to an even greater increase in government spending on those sectors.

Variables relevant to fiscal illusion theory, namely the deficit ratio and the indirect tax ratio, do not have an effect on many functional budget categories. Only consistent with theoretical expectations is the result that there is a correlation between the deficit ratio and government spending that is both positive and statistically significant, which suggests that the socio-economic demands created by the reunification of Germany resulted in larger fiscal deficits. However, the indirect tax ratio did not play a major role in the increase in public spending.

In summary, this study has demonstrated that there is a correlation that is both positive and statistically significant between total spending and per capita GDP, population density, unemployment rate, economic openness, government coalitions, the number of public employees, and the deficit ratio. Within social security spending, all socio-economic factors except economic openness are positively related with high significance. The election and public employees also show such relationships while right party control has the expected negative relationship after reunification. Per capita GDP, population density, the young population, unemployment rate, right party control, and public employees are all positively related to education spending after reunification. The coalition government and the elderly population are found to have significant but negative impacts. In economic services spending, unemployment rate, economic openness, coalition government, right party control, and public employees all have significant and positive relationships. Within health spending, while public employees have a positive relationship, population density, the elderly population, and deficit ratio are negatively related, following reunification. Almost all variables,

except elections, are either positively or negatively related to public safety spending. Population density, age composition factors, and unemployment rates have significant and positive impacts on defense spending, whereas right party control is the only variable with a negative impact after reunification.

Using the expenditure ratio, this study finds that following reunification, Germany underwent a slight increase in the centralization of spending related to total spending and spending on social security, economic services, health, and public safety. Moreover, the composite ratio suggests that fiscal centralization was even more pronounced in the post-reunification period. This may be due to Germany's unique fiscal mechanism, or the "fiscal equalization system," which insures that the central government dominates both revenue collection and sharing.

6.2. Implications of the Study

The dynamics of government expenditure caused by social disturbance provide public finance scholars and budget decision makers with some important lessons. To begin with, during and after a social disturbance, power and authority of public organizations and bureaucrats are likely to increase. The panic that arises during crises results in the adoption of interventionist policies aimed at increasing government spending and authority.

In addition, the change in the composition of government spending may be pronounced as a result of new government demands following social disturbances and is unlikely to be easily reversed. Government and public servants can also often develop special programs or policies for which implementation had previously been difficult or delayed during non-crisis periods due to extreme conflicts and lobbies of stakeholders.

The occurrence of social disturbance also illustrates a reason why the roles of the central

government are not undermined. When social disturbances occur, local governments and national legislators rarely oppose the centralization of government functions (such as budget allocation, revenue sharing, and other budgetary decisions) and taxpayers easily accept these changes throughout the duration of the social disturbance, thus preventing a weakening of the central government.

These changes may continue over quite a long period of time after crises have diminished, because the newly created bureaucracies may prevent government spending and power from returning to pre-crisis levels. It stands to reason that while crises are temporary, the increase in government expenditures following crises is often permanent.

Understanding the effects of social disturbances can help policy makers improve their emergency management approaches. Scholars have argued that political, demographic, administrative, and financial factors must be taken into consideration when forming an effective emergency management system (Lindell and Meier 1994). This study lays the foundation for future research into the effects that emergencies related to social disturbances have on the relationship between federal and local governments and on the government's emergency management systems.

The aforementioned findings and implications of this study are also found in other social disturbances, although the scope and degree of change in government expenditure and public administration may vary depending on their types. Despite the limitations of comprehensive analysis, some studies focusing on national security crises or extreme natural disasters have found that government spending, particularly with regards to emergency management functions, would increase substantially. For example, after the September 11 terrorist attacks and Hurricane Katrina, budget allocation toward responding to terrorism and preventing natural disasters has shown significant increase, compared to other spending categories (Gupta et al. 2004; Noy and Nualsri

2008). Also, since the Hurricane Katrina, fiscal authority of natural hazard relief has shifted from state and locality to federal government (Birkland and Waterman 2008).

Moreover, although studies have not yet been developed in greater extent, the occurrence and aftermath of financial crisis, regime changes in transition economy, and extreme weather events, which have recently happened in many countries, may also demonstrate multi-dimensional changes in government spending and public administration.

This study may also point to significant implications for countries which might face the social disturbances of reunification or economic integration. Notably, findings of this study may provide valuable lessons for the reunification of South and North Korea, the only ethnic nation divided into two countries in the world.

The most valuable lesson of this study for the South Korean government is that minimizing fiscal burden by thoroughly analyzing what determinants would have a strong impact on government spending after reunification and carefully prioritizing reunification policies is of utmost importance. As confirmed in this dissertation, drastic increases in government expenditure and national debt are clearly identified. In addition, social security spending would be the most significant factor, because of massive social assistance programs, primarily for cushioning against economic shock and guaranteeing living standards in under-developed regions. However, balancing the public budget by reducing social security spending or raising taxes is likely to be tackled by political pressure. Therefore, the government should fully assess determinants affecting government expenditure and fiscal policies and prepare strategies to keep public finances sound and sustainable at the time of reunification.

It will be also essential to prevent distortions in the labor market and control massive migration from the North to the South. In Germany, high wages and generous social benefits

without consideration of low labor productivity ended up in high unemployment rates and an increased burden on social security spending. In addition, a sudden influx of people accelerated the distortion of the labor market, absorbing additional social security spending. Given North Korea's already extremely underperforming economy and low labor productivity, high unemployment rates coupled with massive migration is likely to deteriorate South Korea's fiscal balance. Therefore, the South Korean government needs to minimize labor market distortion by introducing an incentive mechanism for people to stay in the North and controlling social welfare levels.

Given both North and South Koreas' aging populations requiring bigger pensions and welfare spending, the fiscal burden is likely to continue to rise for a considerable number of years after reunification. Therefore, before reunification, the social welfare system of South Korea should be transformed to increase labor productivity and create more employment since it will likely be applied to the North after reunification. In Germany, the transplant of the West German social welfare system to East Germany drove drastic increases in government expenditure.

In the end, reunification would lead to the expansion of government roles and strengthening of the central government's authority. Thus, the South Korean government should consider how to raise the efficiency of the government's organization and how to maintain administrative reforms after reunification. Effective systems of revenue allocation between central and local governments also need to be considered with response to a new arrangement of a unified government.

6.3. Limitations and Future Research Direction

It is important to consider the potential limitations of this research when drawing conclusions from the empirical results. One of the potential limitations is that additional determinants could have been added to show more dynamics in the size and composition of

government expenditure. For example, the inclusion of *the median income voter model* and the *Baumol's cost disease model*, for which state-level data was not available in this study, could have provided more sophisticated explanations of government expenditure changes.

There is also a potential problem with the statistical models, as was briefly mentioned in the methodology section. This study employed the OLS model with Driscoll/Kraay standard errors, which has been used less frequently in panel data studies than the PCSE method. In future research, a comparison of empirical results using both methods will produce more accurate analysis.

Moreover, implementing a composite ratio has been proven to examine the level of fiscal decentralization in total government spending more accurately. However, this study could not use this ratio in examining change in fiscal decentralization of functional spending categories due to an inability to get the revenue data linked to those categories. Thus, in order to display a more in-depth understanding of fiscal decentralization throughout total and sub-policy spending, it would be necessary to apply the fiscal indicator reflecting both spending and revenue by capturing the linkage of the revenue sharing system and intergovernmental transfer to spending on sub-policy areas between federal and state governments.

Based on these implications and limitations, more investigation of changes in government expenditures following other social disturbances, such as the current financial crisis, the structural transition of Eastern European countries, and catastrophic weather disasters, should be made for elaborated theoretical generalization of the fiscal dynamics of social disturbances. For instance, it may be the case that the current global economic crisis has increased total government expenditure and the amount of budget allocations to economy-related and social welfare areas along with fiscal centralization. If we can further examine those social disturbances, we can identify more multi-faceted characteristics of various social disturbances and establish better theories for future research.

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Appendices

Appendix A

Election Year and Party Control in Federal and States (1972-1990)

Year	Federal	Baden-Wurttemberg	Bayern	Berlin (West)	Bremen	Hamburg
1972	SPD/FDP	CDU	CDU	SPD	SPD	SPD
1973	SPD/FDP	CDU	CDU	SPD	SPD	SPD
1974	SPD/FDP	CDU	CDU	SPD	SPD	SPD/FDP
1975	SPD/FDP	CDU	CDU	SPD/FDP	SPD	SPD/FDP
1976	SPD/FDP	CDU	CDU	SPD/FDP	SPD	SPD/FDP
1977	SPD/FDP	CDU	CDU	SPD/FDP	SPD	SPD/FDP
1978	SPD/FDP	CDU	CDU	SPD/FDP	SPD	SPD
1979	SPD/FDP	CDU	CDU	SPD/FDP	SPD	SPD
1980	SPD/FDP	CDU	CDU	SPD/FDP	SPD	SPD
1981	SPD/FDP	CDU	CDU	CDU	SPD	SPD
1982	SPD/FDP	CDU	CDU	CDU	SPD	SPD
1983	CDU/FDP	CDU	CDU	CDU/FDP	SPD	SPD
1984	CDU/FDP	CDU	CDU	CDU/FDP	SPD	SPD
1985	CDU/FDP	CDU	CDU	CDU/FDP	SPD	SPD
1986	CDU/FDP	CDU	CDU	CDU/FDP	SPD	SPD
1987	CDU/FDP	CDU	CDU	CDU/FDP	SPD	SPD/FDP
1988	CDU/FDP	CDU	CDU	CDU/FDP	SPD	SPD/FDP
1989	CDU/FDP	CDU	CDU	SPD/GREEN	SPD	SPD/FDP
1990	CDU/FDP	CDU	CDU	CDU/FDP	SPD	SPD/FDP

Year	Hessen	Niedersachsen	Nordrhein-Westfalen	Rheinland-Pfalz	Saarland	Schleswig-Holstein
1972	SPD/FDP	SPD/FDP	SPD	CDU	CDU	CDU
1973	SPD/FDP	SPD/FDP	SPD	CDU	CDU	CDU
1974	SPD/FDP	SPD/FDP	SPD	CDU	CDU	CDU
1975	SPD/FDP	SPD/FDP	SPD	CDU	CDU	CDU
1976	SPD/FDP	SPD/FDP	SPD	CDU	CDU	CDU
1977	SPD/FDP	SPD/FDP	SPD	CDU	CDU/FDP	CDU
1978	SPD/FDP	CDU	SPD	CDU	CDU/FDP	CDU
1979	SPD/FDP	CDU	SPD	CDU	CDU/FDP	CDU
1980	SPD/FDP	CDU	SPD	CDU	CDU/FDP	CDU
1981	SPD/FDP	CDU	SPD	CDU	CDU/FDP	CDU
1982	SPD/FDP	CDU	SPD	CDU	CDU/FDP	CDU
1983	SPD/GREEN	CDU	SPD	CDU	CDU/FDP	CDU
1984	SPD/GREEN	CDU	SPD	CDU	CDU/FDP	CDU
1985	SPD/GREEN	CDU	SPD	CDU	SPD	CDU
1986	SPD/GREEN	CDU/FDP	SPD	CDU	SPD	CDU
1987	CDU/FDP	CDU/FDP	SPD	CDU/FDP	SPD	CDU
1988	CDU/FDP	CDU/FDP	SPD	CDU/FDP	SPD	SPD
1989	CDU/FDP	CDU/FDP	SPD	CDU/FDP	SPD	SPD
1990	CDU/FDP	SPD/GREEN	SPD	CDU/FDP	SPD	SPD

Source: State Statistical Office **Note: "*" is coalition government, shade is election year**

Election Year and Party Control in Federal and States (1991-2006)

Year	Federal	Baden-Wurttemberg	Bayern	Berlin (West)	Bremen	Hamburg	Hessen	Niedersachsen
1991	CDU/FDP	CDU	CDU	CDU/FDP	SPD	SPD	SPD/GREEN	SPD/GREEN
1992	CDU/FDP	CDU/SPD*	CDU	CDU/FDP	SPD/FDP	SPD	SPD/GRN	SPD/GRN
1993	CDU/FDP	CDU/SPD*	CDU	CDU/FDP	SPD/FDP	SPD	SPD/GRN	SPD/GRN
1994	CDU/FDP	CDU/SPD*	CDU	CDU/FDP	SPD/FDP	SPD	SPD/GRN	SPD
1995	CDU/FDP	CDU/SPD*	CDU	CDU/FDP	CDU/SPD*	SPD	SPD/GRN	SPD
1996	CDU/FDP	CDU/FDP	CDU	CDU/FDP	CDU/SPD*	SPD	SPD/GRN	SPD
1997	CDU/FDP	CDU/FDP	CDU	CDU/FDP	CDU/SPD*	SPD	SPD/GRN	SPD
1998	CDU/FDP	CDU/FDP	CDU	CDU/FDP	CDU/SPD*	SPD/GRN	SPD/GRN	SPD
1999	SPD/GRN	CDU/FDP	CDU	CDU/FDP	CDU/SPD*	SPD/GRN	CDU/FDP	SPD
2000	SPD/GRN	CDU/FDP	CDU	CDU/FDP	CDU/SPD*	SPD/GRN	CDU/FDP	SPD
2001	SPD/GRN	CDU/FDP	CDU	SPD	CDU/SPD*	SPD/GRN	CDU/FDP	SPD
2002	SPD/GRN	CDU/FDP	CDU	SPD	CDU/SPD*	CDU/FDP	CDU/FDP	SPD
2003	SPD/GRN	CDU/FDP	CDU	SPD	CDU/SPD*	CDU/FDP	CDU/FDP	CDU/FDP
2004	SPD/GRN	CDU/FDP	CDU	SPD	CDU/SPD*	CDU	CDU/FDP	CDU/FDP
2005	SPD/GRN	CDU/FDP	CDU	SPD	CDU/SPD*	CDU	CDU/FDP	CDU/FDP
2006	CDU/SPD*	CDU/FDP	CDU	SPD	CDU/SPD*	CDU	CDU/FDP	CDU/FDP

Year	Nordrhein-Westfalen	Rheinland-Pfalz	Saarland	Schleswig-Holstein	Brandenburg	Mecklenburg Vorpommern	Thueringen	Sachsen	Sachsen-Anhalt
1991	SPD	SPD/FDP	SPD	SPD					
1992	SPD	SPD/FDP	SPD	SPD	SPD/FDP	CDU/FDP	CDU/FDP	CDU	CDU/FDP
1993	SPD	SPD/FDP	SPD	SPD	SPD/FDP	CDU/FDP	CDU/FDP	CDU	CDU/FDP
1994	SPD	SPD/FDP	SPD	SPD	SPD	CDU/SPD*	CDU/SPD*	CDU	SPD/GRN
1995	SPD	SPD/FDP	SPD	SPD	SPD	CDU/SPD*	CDU/SPD*	CDU	SPD/GRN
1996	SPD	SPD/FDP	SPD	SPD/GRN	SPD	CDU/SPD*	CDU/SPD*	CDU	SPD/GRN
1997	SPD	SPD/FDP	SPD	SPD/GRN	SPD	CDU/SPD*	CDU/SPD*	CDU	SPD/GRN
1998	SPD	SPD/FDP	SPD	SPD/GRN	SPD	SPD	CDU/SPD*	CDU	SPD
1999	SPD	SPD/FDP	SPD	SPD/GRN	CDU/SPD*	SPD	CDU	CDU	SPD
2000	SPD	SPD/FDP	CDU	SPD/GRN	CDU/SPD*	SPD	CDU	CDU	SPD
2001	SPD	SPD/FDP	CDU	SPD/GRN	CDU/SPD*	SPD	CDU	CDU	SPD
2002	SPD	SPD/FDP	CDU	SPD/GRN	CDU/SPD*	SPD	CDU	CDU	CDU/FDP
2003	SPD	SPD/FDP	CDU	SPD/GRN	CDU/SPD*	SPD	CDU	CDU	CDU/FDP
2004	SPD	SPD/FDP	CDU	SPD/GRN	CDU/SPD*	SPD	CDU	CDU/SPD*	CDU/FDP
2005	CDU/FDP	SPD/FDP	CDU	CDU/SPD*	CDU/SPD*	SPD	CDU	CDU/SPD*	CDU/FDP
2006	CDU/FDP	SPD	CDU	CDU/SPD*	CDU/SPD*	CDU/SPD*	CDU	CDU/SPD*	CDU/SPD*

Source: State Statistical Office **Note: "*" is coalition government, shade is election year**

Appendix B

Empirical Results of PCSE Model

(1) Determinants of Per Capita Total Spending

Variables	Overall (1972-2006)		Before Reunification (1972-1990)		After Reunification (1991-2006)	
Reunification	173.4124	***				
Constant	5181.8360	***	2597.3910	**	6381.8930	***
Socio-economic Variables						
Per capita GDP	0.0598	***	0.0965	***	0.0363	***
Population density	0.3604	***	-0.1232		0.5109	***
Population under 18(%)	-70.4817	***	-20.6711		-51.9236	**
Population over 65(%)	-1.0499		3.0738		-4.6514	
Unemployment Rate (%)	73.5691	***	36.2800	***	113.0196	***
Openness of Economy (%)	-46.9907		406.6800	**	469.8195	***
Political Variables						
Right Party Control	-10.8516		84.6135	*	-95.0482	**
Election	12.6006		11.8097		23.4887	
Coalition Government	54.2340		40.8432		87.3112	**
Institutional Variables						
Public Employees (%)	166.3938	***	405.3825	***	171.9357	***
Indirect Tax Ratio (%)	1.2957		-6.1179		0.7769	
Deficit Ratio (%)	6.2926	***	1.3447		15.2776	***
R-squared	0.7433		0.7858		0.9183	
Wald chi2(14)	1821.63		1285.99		2630.69	
Prob > chi2	0		0		0	

Note: ***p<0.01, **p<0.05, *p<0.10

(2) Determinants of Per Capita Social Security Spending

Variables	Overall (1972-2006)		Before Reunification (1972-1990)		After Unification (1991-2006)	
Reunification	51.7064					
Constant	3639.4290	***	2036.0060	**	3902.5690	***
Socio-economic Variables						
Per capita GDP	0.0237	***	0.0273	***	0.0116	***
Population density	0.0396		-0.0736		0.1723	***
Population under 18(%)	-25.0976	**	-18.2824		19.5533	*
Population over 65(%)	10.4159		9.3736		49.8203	***
Unemployment Rate(%)	12.2281	**	8.5231		13.3308	***
Openness of Economy (%)	-63.1754		92.6292		-73.2794	
Political Variables						
Right Party Control	16.7417		64.9170	*	-79.8684	***
Election	-7.7593		-5.9367		3.8262	
Coalition Government	4.4352		7.3540		25.3372	
Institutional Variables						
Public Employees (%)	22.3896		40.5357		18.0484	
Indirect Tax Ratio (%)	-0.8094		2.4279		-1.0405	
Deficit Ratio (%)	2.1710	*	3.1891	*	1.5011	
R-squared	0.7078		0.5946		0.9763	
Wald chi2(14)	1313.41		401.25		10948.82	
Prob > chi2	0		0		0	

Note: ***p<0.01, **p<0.05, *p<0.10

(3) Determinants of Per Capita Education Spending

Variables	Overall (1972-2006)		Before Reunification (1972-1990)		After Reunification (1991-2006)	
Reunification	78.0384	***				
Constant	356.9766	**	101.2110		-556.7436	**
Socio-economic Variables						
Per capita GDP	0.0128	***	0.0167	***	0.0094	***
Population density	-0.0174		-0.1192	***	0.0379	***
Population under 18(%)	-13.6728	***	-11.9953	***	21.3191	***
Population over 65(%)	-16.7326	***	-0.4615		-7.3179	
Unemployment Rate (%)	13.4229	***	9.5645	***	14.6398	***
Openness of Economy (%)	-117.7571	***	-54.9986		-71.4090	*
Political Variables						
Right Party Control	8.9747		0.2503		21.7408	*
Election	3.2894		4.7360		-1.1591	
Coalition Government	-2.0343		9.1653		-23.0530	**
Institutional Variables						
Public Employees (%)	31.8250	***	57.6664	***	16.6081	**
Indirect Tax Ratio (%)	-1.3156	**	-0.7753		-0.4390	
Deficit Ratio (%)	0.0424		-1.0166	*	1.5128	**
R-squared	0.7259		0.7264		0.8469	
Wald chi2(14)	1530.05		1025.62		1199.71	
Prob > chi2	0		0		0	

Note: ***p<0.01, **p<0.05, *p<0.10

(4) Determinants of Per Capita Economic Services Spending

Variables	Overall (1972-2006)		Before Reunification (1972-1990)		After Reunification (1991-2006)	
Reunification	53.4893	**				
Constant	1178.3180	***	1178.2150	***	610.4594	
Socio-economic Variables						
Per capita GDP	0.0042	**	0.0086	***	0.0003	
Population density	-0.0825	***	-0.0237		-0.0796	***
Population under 18(%)	-25.1426	***	-24.6416	***	-3.2215	
Population over 65(%)	-24.1225	***	-20.2848	**	-12.5404	
Unemployment Rate (%)	9.2720	***	-2.8016		15.4752	***
Openness of Economy (%)	-102.1723	**	-129.5991	**	-6.8221	
Political Variables						
Right Party Control	15.9917		26.0126	*	35.3420	*
Election	5.3803		6.6462		10.4908	
Coalition Government	14.5069		-2.8191		21.8923	
Institutional Variables						
Public Employees (%)	35.2886	***	10.2831		59.9792	***
Indirect Tax Ratio (%)	0.3991		-1.6045		1.0785	
Deficit Ratio (%)	1.5106	**	-0.5368		2.8067	***
R-squared	0.3288		0.3703		0.4152	
Wald chi2(14)	245.14		194.64		90.35	
Prob > chi2	0		0		0	

Note: ***p<0.01, **p<0.05, *p<0.10

(5) Determinants of Per Capita Health Spending

Variables	Overall (1972-2006)		Before Reunification (1972-1990)		After Reunification (1991-2006)	
Reunification	6.0879					
Constant	952.6111	***	217.2478		460.2986	
Socio-economic Variables						
Per capita GDP	-0.0005		0.0122	***	-0.0033	
Population density	-0.0544	***	-0.1117	***	-0.0339	
Population under 18(%)	-17.6656	***	-5.2675	*	3.7738	
Population over 65(%)	-30.9681	***	-8.2222	*	-23.5409	**
Unemployment Rate (%)	0.5219		0.2638		-2.9831	
Openness of Economy (%)	-37.6204		58.1103	*	-31.2681	
Political Variables						
Right Party Control	16.8535		2.8975		16.0525	
Election	-1.1310		4.9678	*	-4.8229	
Coalition Government	-1.9667		-3.4795		-12.7262	
Institutional Variables						
Public Employees (%)	68.8147	***	86.1661	***	67.6719	***
Indirect Tax Ratio (%)	-1.3319	*	-3.5886	***	-0.3628	
Deficit Ratio (%)	-0.0966		-0.4433		-1.1006	
R-squared	0.332		0.7555		0.4357	
Wald chi2(14)	233.54		991.63		132.92	
Prob > chi2	0		0		0	

Note: ***p<0.01, **p<0.05, *p<0.10

(6) Determinants of Per Capita Public Safety Spending

Variables	Overall (1972-2006)		Before Reunification (1972-1990)		After Unification (1991-2006)	
Reunification	13.5964	*				
Constant	-255.6598	***	-6.3633		-207.5344	
Socio-economic Variables						
Per capita GDP	0.0073	***	0.0067	***	0.0051	***
Population density	0.0449	***	-0.0350	***	0.0713	***
Population under 18(%)	-5.6961	***	-3.7587	**	-11.6414	***
Population over 65(%)	14.6642	***	-0.5558		17.2417	***
Unemployment Rate (%)	5.4086	***	3.7100	***	5.5827	***
Openness of Economy (%)	-59.4753	***	1.6501		-63.6480	***
Political Variables						
Right Party Control	10.6542	**	-0.7765		13.9777	*
Election	1.2170		1.2705		0.2366	
Coalition Government	5.9924		5.5557		8.9318	
Institutional Variables						
Public Employees (%)	-6.3381	*	36.5536	***	-13.8158	***
Indirect Tax Ratio (%)	0.2737		-0.1738		0.3619	
Deficit Ratio (%)	0.3981	*	-0.3067		1.4066	***
R-squared	0.6518		0.8121		0.7346	
Wald chi2(14)	1308.05		1435.35		899.92	
Prob > chi2	0		0		0	

Note: ***p<0.01, **p<0.05, *p<0.10

(7) Determinants of Per Capita Defense Spending

Variables	Overall (1972-2006)		Before Reunification (1972-1990)		After Reunification (1991-2006)	
Reunification	-19.6243	***				
Constant	611.3966	***	614.6818	***	855.9256	***
Socio-economic Variables						
Per capita GDP	0.0010	**	0.0026	***	0.0008	
Population density	-0.0100	**	-0.0229		-0.0154	***
Population under 18(%)	-3.6998	***	-3.4355	**	-10.8587	***
Population over 65(%)	-3.1106	**	1.2856		-11.2708	***
Unemployment Rate (%)	-1.3404	**	-2.2257	**	-2.4055	***
Openness of Economy (%)	-32.7857	***	-27.9306		-14.0870	
Political Variables						
Right Party Control	2.5268		9.5960	**	8.4194	*
Election	-0.5584		-1.8928		-0.9821	
Coalition Government	-0.8367		-3.9405		-2.7702	
Institutional Variables						
Public Employees (%)	4.7007	**	11.5507	**	2.9988	
Indirect Tax Ratio (%)	0.1242		-0.3753		0.0491	
Deficit Ratio (%)	-0.0838		0.4589	**	-0.4451	**
R-squared	0.7449		0.9213		0.8350	
Wald chi2(14)	1444.04		2677.38		1286.78	
Prob > chi2	0		0		0	

Note: ***p<0.01, **p<0.05, *p<0.10