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THE POLITICAL ECONOMY OF DEVELOPING COUNTRIES:

AN EMPIRICAL ANALYSIS

BY

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND TO THE STUDY

This thesis studies how policy uncertainty at the macroeconomic level generated by the political process influences growth, investment, and openness in developing countries. The topic of uncertainty is one of the most widely studied topics in modern economics. By concentrating specifically on policy uncertainty, both political and economic cycles are brought to the forefront of the macro-economic debate. On one hand, the study of political economy initially told us that political cycles can be explained by favorable economic conditions before an election and unfavorable economic conditions immediately after an election. Following the Phillips curve, a government can choose levels of inflation and growth that suit its objectives. On the other hand, recent evidence has shown that the relationship between economic and political cycles and institutions is more complex than what was originally believed.[1] A Phillip's curve approach assumes the government can manipulate the economy through fiscal and monetary policy measures to achieve the desired outcome: re-election. Instead, a rational expectations approach assumes that capital owners will monitor the political conditions surrounding them and act in a manner that best suits their own objectives over the objectives of the government. What is offered here is an extension of contemporary work surrounding policy uncertainty by looking at two different components of the political

[1] Alesina, Roubini, and Cohen (1997) to name a few support this view.

process and analyzing how they affect the macro-economy. The first component is how the macro-economy reacts when a new government comes to power. The second component is how the macro-economy reacts to the various philosophies governments hold. A rational expectations approach is taken.

This work is especially important for developing countries. As a whole, non-industrialized countries have experienced a more checkered growth record than industrialized countries. Also, generally speaking non-industrialized countries have experienced a wider spectrum of competing political ideologies and explosive political dynamics than developed countries. For example, although there are two main competing political parties in the United States, both parties operate on a generally conservative platform. A change in government in the US does not signal a significant shift in existing business practices or pose a threat to the existence of the legal and institutional lay out of the land.

In other parts of the world the political system has not been so calm. South America has been characterized by governments that span the entire political spectrum, often times creating dramatic changes in the fundamental role of government. To highlight only a few of the relevant examples, Chile in the 1960's saw wide swings in the political pendulum by changing from a conservative, to a communist, to finally a long term autocratic right-wing military government which implemented a new constitution for the country. Argentina in the 1970's saw excessive levels of government turnover that ranged from military to populist to socialist to conservative. Ecuador and Brazil also saw wide varieties of political ideology within various governments. Other developing regions of the world have had their own dynamics. African countries, since

independence, have seen the development of long-term far-reaching governments that have exerted tremendous influence in eliminating opposition. Nigeria, the most populous African country, has seen successive military and civilian governments. Other African countries have had long-term governments that have often maintained power through largely dictatorial and undemocratic processes, paying sometimes scant attention to the institutional framework of the country. Asian countries have been characterized as working towards their own blend of government control and free-market mixing to foster economic development. Countries such as Thailand, South Korea, Indonesia and the Philippines have seen the military play a large role in influencing the domestic political process. Where as other counties in the region like Taiwan, China, and Malaysia have seen their own nationalistic and often times autocratic influences in the political process. To what extent does the political system affect the economic system is indeed a challenging and interesting question. Although each country has its own unique political history, some countries being more stable than others, developing countries as a whole have seen a wide variety of political dynamics that warrant further research in the area of political economy.

Growth and sound macroeconomic fundamentals in developing countries during the last 30 years have met with various degrees of success and failure. Neoclassical growth models predict that a country's per capita growth rate is inversely related to its initial level of per capita income.[2] Diminishing returns in industrialized countries would send capital owners seeking more profitable investments elsewhere, thereby encouraging physical and human capital to flow into the developing world. But as the world economy begins the 21st century, large differences in levels of GDP across countries still exist. In

[2] These ideas were initially put forth by Solow (1956) and Cass (1965).

fact, some industrialized countries in the late 1990's experienced growth rates that are usually more associated with booming economies in the developing world.

In an attempt to explain why developing countries have failed to see their GDP's converge to the levels of industrialized countries, various explanatory measures have been put forth. From a human capital viewpoint, several different indicators have been used to capture the educational, health, and general well-being of the domestic population. Specifically, some of the more common measures include primary and secondary levels of school enrollment for boys and often times more importantly for girls, adult literacy measures, and government spending in the human services areas of education, health, and welfare. Population growth rates are also thought to be important. Fast growing populations are seen to have a negative effect on GDP due to the pressure future governments will have in expanding the countries' infrastructure and resources to accommodate more people. Commonly used physical capital measures include the level of investment as a percentage of GDP, the level of capital inflows and outflows, and levels of foreign investment. From a policy viewpoint, various fiscal and monetary measures are regularly tracked. What else should be considered a factor and incorporated into the debate on GDP growth is still an open question. Instead of only concentrating on economic factors, paying more attention to the political and legal ramifications of a country may prove to be helpful. The economic well-being of a country does not operate in its own cocoon. Instead, the economic system of a country must operate within the political and legal environment of the state. In line with this, various degrees of policy uncertainty in countries can be considered one possible explanation as to why a textbook formula for development fails, despite a country's adherence to certain fundamental

rules.[3] If the domestic and international community fail to believe the government's commitment to new growth policies, then investment levels will fall short of the optimum that could have been received if the owners of capital perceived a stronger commitment to reform on behalf of the government. Developing countries in the 21st century need to continue to pursue policies that will increase the quality of life of their citizens. Their level of development falls short of what was originally predicted by Solow back in 1956. By further examining the role political uncertainty has on the macro economy, another piece of the development puzzle will hopefully be better understood. This would contribute to providing a more complete picture of the various challenges facing developing countries.

1.2 RESEARCH OBJECTIVES

The primary purpose of this dissertation is to examine the consequences on the macro-economy of new governments coming to power and to examine the consequences of various ideologies of political regimes. In specific terms, I examine two questions. The first is how a change in government, measured by a new head of state attaining power in a country, affects per capita GDP, investment, and openness. The second is how different ideologies of political regimes, measured on a spectrum from extreme left wing governments to extreme right wing governments, affect per capita GDP, investment, and openness. **I focus on whether per capita GDP, investment, and openness are affected positively or negatively by new governments, extremist governments, left-of-center governments, center governments, and right-of-center**

[3] The "fundamentals" are not widely agreed upon. The IMF has been exceedingly finicky in distributing advice to developing countries on what constitutes fundamental rules of macroeconomic policy.

governments. In line with this theme, the investigation will not be directed at the question of whether an incumbent government remains in power or not. Rather, I consider how the economy reacts in years when people perceive the probability of a new government to be high, and this comes true.

In attempting to test the above propositions, I use a rational expectations approach (stemming from the works of, *inter alia* Barro (1989), Aizenman and Marion (1991), and Ramey and Ramey (1995)) to analyze how the macro economy reacts to policy uncertainty. Unlike these researchers, who proxied policy uncertainty on measures such as violent political upheaval and unexpected or extreme fiscal and monetary policy measures, I measure policy uncertainty according to the presence of a new government in power and on the various ideologies of political regimes. The importance of these newly developed policy uncertainty proxies is that they capture circumstances that affect all countries. The political process is a system that co-exists with the economic system. The extent to which the political system affects the economy is of interest to all participants in the economic marketplace. Investors must consistently monitor a country's political stability and philosophy in order to interact within the economic system. When uncertainty is created by the political process, capital owners fear the government may fail to fully up-hold its role as the ultimate protector of property rights. Capital owners may speculate that calculated risk-taking through the marketplace will not be property rewarded.

1.3 OUTLINE OF THE STUDY

The rest of this dissertation is organized as follows. Following the introduction presented in this chapter, Chapter 2 further focuses on the connection between policy uncertainty and property rights. Governments have a responsibility to maintain an environment where calculated risk-taking is properly rewarded. The importance of government signals, and the subsequent reactions by capital owners, is highlighted in this discussion. Chapter 3 reviews the empirical and theoretical literature on how policy uncertainty affects the macro economy. Various measures of policy uncertainty have been used in different studies. This review shows how uncertainty measures developed in this study fall into the broad spectrum of examining uncertainty. Chapter 4 presents in more detail the theory addressing the impact of policy uncertainty on the macro economy. According to Rodrik, policy uncertainty acts as a negative tax on investment. Chapter 5 discusses the model used in this paper and its predictions. A section on the type and sources of the data used to test the model's prediction is included. In short, a cross section of 42 developing countries from Latin America, Asia and Africa make up the panel data set. The time frame is from 1960 to 1992. Chapter 6 provides a summary of the empirical evidence on per capita GDP, investment, and openness. Specifically, the analysis focuses on the effects of changes in government and government ideology on developing countries' economies. The final chapter (Chapter 7) draws together the findings and the conclusions. Areas of future research are identified.

CHAPTER 2

THE RELATIONSHIP BETWEEN PROPERTY RIGHTS, ECONOMIC EFFICIENCY AND POLICY UNCERTAINTY

2.1 INTRODUCTION

Policy uncertainty can be viewed as a tax, a liability that will decrease the return on assets to capital owners. Motivation for capital owners to react negatively to policy uncertainty (a position taken in this paper) originates from the government's role as the ultimate protector of property rights. Through policymaking, the government demonstrates its ability to keep and maintain an honest, economically efficient marketplace where calculated risk-taking will be properly rewarded. The government's ability to do this reflects on domestic asset and property values. Posner writes, "the legal protection of property rights creates incentives to use economic resources efficiently." [4] It is precisely this type of environment that attracts both domestic capital and outside capital to developing countries. Clearly, a country's economic, political and legal system are intertwined. All three must operate independently in a manner that coincides with the conditions created by the others. A breakdown in one area can spill over and create negative externalities in another. The far-reaching role of government in any country includes both public policy creation and overseeing of the legal system. Even when the judiciary acts as a separate branch of government, the ability to influence the laws of the land, whether in a blatant or a subtle manner, gives the government a tremendous amount of responsibility.

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[4] Posner, Economic Analysis of Law, University of Chicago Press, 1995

This section attempts to first establish the links between property rights and economic efficiency. Next the issue of how policy uncertainty, mainly generated by the political process, can interfere with the government's role as the ultimate protector of property rights and thus harm economic efficiency will be discussed. In sum, the government must convincingly signal to capital owners that future policy is economically sound and good for growth so that resources will be used efficiently and rates of return will be maximized. The government must convince the domestic and international community of its competence in future policy making. The failure to respect or protect property rights can take many forms. In the extreme case, outright nationalization of private property without monetary compensation will cause a complete break-down in the country's existing economic system. In a less extreme, but more common scenario, the government fails to protect the value of property by creating policies that create doubt as to the future rate of return of assets. This happens either because of government incompetence or because the government has ulterior objectives besides maximizing growth and promoting development at home. Whatever the case, uncertainty results and capital owners will invest elsewhere.

2.2 PROPERTY RIGHTS AND ECONOMIC EFFICIENCY

The historical relationship between property rights and economic efficiency goes back to the principles fostered by the English royal courts in their development of common law. When examined from an economic viewpoint, common law covers the law of property, contracts, and torts. The law of property concerns creating and defining property rights, which are exclusive rights to resources. The law of contracts facilitates

the voluntary transfer of property rights to owners who place the highest value on them. The law of torts deals with rectifying injuries to these and other rights. The economic theory of property rights demonstrates how the legal protection of property creates incentives to use economic resources efficiently. Using a simple example, in a country where property rights cease to exist, a farmer who plants, fertilizes and irrigates his crops has no guarantee his neighbor won't harvest the crops himself and collect the return. In such a scenario, when no return can reasonablely be expected by the farmer who planted the crops, the land as a result will see no investment, or planting by the farmer. In sum, a lack of property rights reduces investment, since no return can be expected to be collected by the investor. The existence of enforced property rights allowing for legally enforceable private ownership is clearly necessary for the efficient use of resources.

Additionally, it is not enough for property rights to merely exist, they must also be transferable. In another example, say a widget factory owner expects a profit of $100 annually. But another entrepreneur has developed a manufacturing process for widgets that requires less labor and could reasonablely expect a $200 annual profit from the same physical plant. The original owner and the entrepreneur both have an incentive to transfer the property rights in the physical plant to the entrepreneur. The minimum price of the transfer will equal the present value of the future earnings expected by the original owner, while the maximum price of the transfer will equal the present value of the future earnings expected by the entrepreneur. When the agreed upon price is within these maximum and minimum boundaries, both parties will come out ahead thru this legally recognized transfer of property.

Although the discussion appears straightforward up to this point, contention arises when uncertainty regarding future earnings is factored in to the analytical environment. Future earnings are dependent on numerous conditions within the economy. The present value of earnings must be discounted by the risk of extra explicit and implicit costs. Future government policy and regulation can play an influential role in determining what these extra costs are. For example, changes in tax policy can have an effect on future earnings. It is well known that the most desirable tax is one that does not subrogate people's economically driven profit making behavior to the whims of politically motivated governmental favoritism. Yet any tax that acts as a form of redistribution is bound to have an effect. If the good in question will be available for export, or if the good in question has imported factors of production, trade policy and exchange rates will have an impact. Also, if any of the compliments or substitutes associated with the good are somehow affected by trade policy, the good in question will still indirectly be affected by import and export restrictions. Policies influencing consumer spending will have an effect on demand. Monetary policy will have an effect on the nominal price of the good and interest rates will affect the company's ability to borrow in the future.

2.1.1 EMINENT DOMAIN

A discussion of property rights is not complete without mentioning the role of eminent domain. Governments have the power of eminent domain, in which the government can seize property in return for just compensation. Instead of grappling with the question of conflicting *claims* on property, eminent domain deals with conflicting *uses* of property. While the difference between conflicting *claims* and conflicting *uses*

may sometimes seem dubious, the distinction becomes clearer when high transaction costs are considered. For example, once construction has begun on a railroad, the cost of re-routing the tracks is extremely high. Homeowners located directly on the planned railroad path can ask for almost any price for their house, knowing that the cost to the railroad of re-routing the tracks around the house would still be considerably more. In this case, high transaction costs will cause inefficiency in terms of either substituting less valuable inputs in place of the overly priced land, or in altogether forgoing other valuable inputs in order to afford the overpriced land. In the end, the consumer is provided with a less efficient service at a higher cost. If the government determines that the best *use* of the land is for it to belong to the railroad, and for the railroad to pay the market value for the land, the government is exercising its power of eminent domain. In this case, the use of the land is distributed in a manner that will maximize the efficiency of resources and benefit society as a whole.

How well the government exercises its right of eminent domain sends a strong signal as to the competence of future policy making. The potential for abuse on behalf of the government is large, given the sensitive role redistributing property rights plays in the economic stability of a country. Eminent domain, if used wisely, can ensure economic resources are used efficiently. If eminent domain is used poorly, not only does it assign resources to sub-optimal uses, it sends a powerful signal that economic efficiency is not valued. Consequences from this will be far reaching. Much needed investment will not be forthcoming. In today's global economy, doubt concerning the effective rate of return will send capital to other more stable parts of the world.

2.3.1 POLICY UNCERTAINTY

Both the government and the private sector have an interest in property rights. The government acts as the regulator, while owners of capital are directly affected by the government's ability to effectively protect property rights and to create policies that will maximize their value. Therefore, capital owners need to perceive strong commitments to growth policies. Government has a responsibility to keep and maintain an honest, economically efficient marketplace where calculated risk-taking will be properly rewarded. In order to do this, the government must make capital owners feel the amount of imperfect information regarding the direction of future policy they receive is minimal. Capital owners will use current policies in order to judge the direction of future policy. This is consistent with a rational expectations approach to predict future policy.[5] Instead of using a backward-looking approach where expectations of future policies are based only on past policies, rational expectations emphasizes how a rational public learns to adjust to the current situation and thereby limit the extent that uncertainty affects investment levels.

Governments have an incentive to operate in a clear, transparent manner in order to provide a favorable signal of the direction of future investment policies. If the signal is successful, capital investments are made and resources are used efficiently. If the signal is not successful and investors are uncertain of the future direction of policy, various levels of government incompetence begin to be factored into rate of return expectations. The more capital owners believe they correctly read the direction of future policy and that the policy direction is good for growth, the more they feel confident their expected

[5] Rational expectations has largely replaced adaptive expectations as an empirically accurate method to predict how policy uncertainty affects various macroeconomic variables.

returns to capital will be realized. It is precisely this type of environment that attracts not only domestic capital but also outside capital to developing countries. When policy uncertainty is at a minimum, economic agents can best go about their business.

Although reasons for high policy uncertainty originate from many different sources, uncertainty attributed to the political process is one primary source of policy uncertainty and is the focus of this discussion.

2.3.1 THE POLITICAL PROCESS AND POLICY UNCERTAINTY

When a new head of state attains power, either through democratic or undemocratic means, a natural question is what will be the direction and effectiveness of future policy making. Will fiscal, monetary and regulatory policy be good for growth? To what extent will existing business practices be respected and will government intervention hurt or help the present and future business environment? Capital owners must initially exhibit a wait and see attitude in order to learn and adjust to the new political environment. Yet, this wait-and-see attitude slows down investment and essentially places an inefficiency tax on investment.

This was the situation in South Africa. When the incumbent President announced early on that he would not stand for re-election, a new head of state was guaranteed to emerge from the national elections in 1999. The election year saw a large decrease in investment as both the domestic and international community watched cautiously as the new administration took office.[6] This decline in investment occurred despite a widely held belief that the change in government would merely result in the country's vice-president becoming its second democratically elected president. Despite the incumbent

[6] International Financial Statistics 1999

government's attempt to signal that the direction of future policy would continue as normal when the new government assumed power, capital owners still believed they had imperfect information regarding the intentions of the new government and waited until it became clear existing policy would stay on track.

As governments change, a key factor in trying to assess the upcoming shifts in policy making is to judge the new government's ideology. Although political convictions are often broadly categorized, they are typically seen as a benchmark for evaluating the means of achieving economic goals. Although any benevolent government would wish economic growth and social development for their country, the manner that various governments approach this objective from a policy viewpoint can vary significantly. Depending on whether the government has a left wing or a right wing ideology, different levels of government intervention are deemed necessary in order to foster the type of development desired. Capital owners will try to read these changes in ideology. For example, when a socialist government replaces a conservative government, capital owners will be wary of more government involvement. Whether or not this increased intervention increases efficiency and judged to be good for economic growth will influence the discounted rate of return on future investments. Rational investors will take all implicit and explicit policy factors into account.

2.3.2 ABUSE OF EMMINENT DOMAIN AND NEGLECT FOR PROPERTY RIGHTS

When a government abuses its power of eminent domain, policy uncertainty can be at an all-time high. Various problems arise when the power of eminent domain is abused. When transaction costs are low, eminent domain actions unnecessarily tax away the

subjective value of property. Also, failure to compensate property owners at a fair market value is demoralizing, creating reasons to use future resources less efficiently. A government may exercise its eminent domain power for its own selfish reasons: to suppress minority groups or political rivals or to reward political supporters. A government may claim eminent domain, when in reality its actions amount to stealing. A present day example of this situation exists in Zimbabwe, where the government of President Mugabe is confiscating private farms without compensating property owners. As a result, the effective rate of property taxation has risen to 100% and capital inflows to Zimbabwe and domestic investment have significantly decreased. This failure to respect property rights is devastating to capital owners and can bring an economy to its knees. Zimbabwe's economy is on the verge of collapse, despite the country's rich natural resources. For the second year in a row, the year 2000 is expected to see a 10% decrease in annual GDP in Zimbabwe. [7] Failure to respect property rights is seen as the primary reason for this. Besides white-owned farms, other sectors of the economy are now fearing they could be next on Mugabe's redistribution adjenda.

2.4 CONCLUSION

If the government fails to fulfill its basic responsibility of protecting the existing property rights system, uncertainty over the return of future investments is undeniably increased. Comparatively, policy uncertainty can be considered an inverse measure of a government's competence. High policy uncertainty creates doubt in the minds of capital owners surrounding the government's ability and desire to create policies that will maximize domestic asset value. Lower domestic asset value means a lower relative

[7] International Financial Statistics 1999

return on domestic investments. Therefore, within the minds of local capita owners, international investments that previously offered a lower rate-of-return will seem more attractive.

The next section (Chapter 3) reviews the empirical and theoretical debate on the topic of policy uncertainty and its effects on the macro economy.

CHAPTER 3

REVIEW OF THE EFFECTS OF POLICY UNCERTAINTY ON THE MACRO ECONOMY

3.1 INTRODUCTION

To date few studies have addressed the full impact of policy uncertainty on the economy. The examination of robust measures of policy uncertainty generated by the political process on the macro economy has been limited due to a lack of good political data. Also, the literature has not vigorously investigated how policy uncertainty affects areas of the macro economy besides growth and investment. More specifically, the effects of policy uncertainty on the traded sector has received very little attention. The purpose of this chapter is to review the literature on the effects of policy uncertainty on GDP and investment, and to a lesser degree on inflation, trade, and exchange rates. The measures of policy uncertainty used in this study, notably changes in government and government ideology, are original. The discussion will show how the data set and the model presented later in this paper fit into the bigger picture of existing literature on the subject of policy uncertainty and its effect on the macro economy.

The main question is whether policy uncertainty has a positive or a negative effect on growth, investment and trade. Studies most relevant to the work done in this thesis are those that measure uncertainty based on political variables. This literature review outlines these studies along with others that measure uncertainty based on a variety of economic variables. The discussion begins by looking at several different cross sectional studies. Second, individual country studies are examined. And third, other issues, like

existing survey literature and firm level analysis in developing countries, are briefly explored.

3.2 GROWTH, INVESTMENT, AND POLICY UNCERTAINTY: EXAMPLES OF CROSS-SECTIONAL ANALYSIS

Growth theorists have examined various uncertainty measures through cross-section analysis. Generally a negative relationship between growth and policy uncertainty was found, especially if governments are associated with a lack of structural reform. Many of the large cross-sectional studies of this nature use the Summers and Heston (1985) data set for their annual macroeconomic data. Barro (1989) uses one of the few datasets that actually contains a policy uncertainty measure that attempts to estimate the effects on the macro economy of the political process. Barro uses political instability, proxied by data on revolutions, coups, and political assassinations, and finds that average growth rates are positively correlated to political stability. These political instability measures were first developed by Banks (1979). Both the number of revolutions and coups per year (REV) and the number per million in population of political assassinations per year (ASSAS) are significantly negative for growth. The variables REV and ASSAS are also significantly negative for investment ratios. Barro attributes his findings to the adverse effect of instability on property rights.

Barro's results come from a broad study on economic growth in a cross section of industrialized and developing countries. Barro contradicts neo-classical growth models by finding that in a cross-section of countries, growth rates are uncorrelated with the starting level of capital per person. Instead, Barro's results show a negative correlation only when human capital per person, measured by school enrollments, are held constant.

Plus, with a given level of per capita GDP, growth is positively related to the amount of human capital. Thus, poor countries will only catch up and converge to industrialized countries if their level of human capital per person is high. Besides political instability, other government related variables include government consumption, and government investment. The former is found to be negatively correlated to growth while the later is found to have no correlation to growth.

A number of other studies have also included the same data set originally developed by Banks. Gasiorowski (1998), using panel data and fixed effects regression analysis, examines the effects of political uncertainty on economic growth and inflation. Both the relationship between the variables and the causality between them is tested. The political instability measures used include peaceful unrest, violent unrest, coup d'etats, and changes in government. Banks (1979) data set is used as a primary data source for these political measures. Gasiorowski concludes, despite some unexpected results, that political instability causes macroeconomic conditions, and not the other way around. Also, political instability had negative consequences for growth and mixed consequences for inflation. Edwards and Tabelline (1991) find that the Banks measures play an important role in explaining cross-country variations in inflation, seigniorage, government borrowing, and fiscal deficit. Cukierman, Edwards, and Tabelline (1992) confirm these results by concluding that after controlling for other variables, political instability is positively associated with seigniorage.

The question of causality between political and economic variables is indeed an important one when conducting empirical research of this sort. Campos and Nugent (1999) also address this issue. Using Granger causality tests, Campos and Nugent

empirically test for a negative and causal long-run relation between instability and economic growth. The political instability measures are broken down into measures categorized as severe and moderate. Severe measures of political instability include the same measures of political assassinations, revolutions and coups d'Etats that have been discussed in other studies. Moderate measures of political instability include competitiveness and regulation of political participation; regulation, competitiveness, and openness of executive recruitment; and the legal and operational independence of the chief executive. The data set spans 98 developing countries in an unbalanced data set spanning five-year periods between 1960 and 1995. Campos and Nugent found no evidence whatsoever of causality flowing from per capital GDP growth to political instability. Evidence supporting the hypothesis that political instability causes negative per capita GDP growth was moderate and statistically significant part of the time. The negative and causal relation was largest in Sub-Saharan Africa.

Other cross-section growth studies have also focused on policy uncertainty and growth. Various kinds of uncertainty measures besides political uncertainty have been used to proxy uncertainty. In general, measures of policy change or measures of economic instability have been used to capture an uncertainty effect. Aizenman and Marion (1991) in an endogenous growth model use various fiscal and monetary policy measurements and find a negative correlation between policy uncertainty and growth for the time period 1970 to 1985 for 46 developing countries. After accounting for standard variables from the endogenous growth literature, such as the initial level of per capita income and a human capital variable, various uncertainty components are factored in.

Eight different policy variables are calculated measuring the amount of change in each policy annually. The unexpected policy was calculated by using a first-order autoregressive process of the form $(Policy)_t = B_0 + B_1(Policy)_{t-1} + E_t$ where B_1 is the autoregressive parameter. The eight policy uncertainty variables include the ratio of government consumption expenditures to GDP: (*gov*), growth in the rate of government consumption expenditures to GDP: (*ggov*), the ratio of public investment to GDP: (*ipub*), the ratio of government budget deficits to GDP: (*def*), the ratio of government revenues to GDP: (*rev*), growth in domestic credit: (*do*), money growth: (*mo*), and finally the inflation rate: (*in*). The results show the negative correlation between policy uncertainty and growth is strongest for some of the fiscal policy measures; namely *gov*, *ggov*, and *ipub*, but is weak for the other two fiscal measures; *def* and *rev*. The correlation between the monetary surprises; *do*, *mo* and *in*, all had a significant negative relationship to growth. Although cross-section regional comparisons show results vary somewhat by geographical location. For example, unexpected monetary and fiscal surprises had positive correlations to growth in Asia, but had negative correlations to growth in Latin America and Africa.

Ramey and Ramey (1995) show a correlation between high fiscal policy volatility and low growth in a cross-section country regression analysis using 92 countries. They found that government induced spending volatility negatively affects growth, even when country specific and time elements are controlled for. Interestingly, when investment was used as a control variable, it had no impact on the regression results. A subset of OECD countries were also tested and the same results were found. Ramey and Ramey support their results by linking them to a similar conclusion developed by Alberto

Alesina et al (1990). Alesina studied the link between political instability and growth, and estimates that the two have a negative relationship. Ramey and Ramey point out that political instability may be an important cause of government spending volatility.

Instead of focusing directly on growth, some cross-section studies have focused on investment. The main question is whether aggregate investment is lower in an uncertain environment. This is particularly relevant to the work done in this thesis. Pinkyck and Solimano (1993) present an empirical study that focuses specifically on measuring macroeconomic policy uncertainty and investment. They emphasize that since investment expenditures are largely irreversible and can be delayed, they may be extremely sensitive to uncertainty. Using both cross-section and time-series data for OECD and Latin American countries they find that uncertainty, proxied by the volatility of the marginal profitability of capital, does affect investment, but the strength of the relationship is moderate, and is stronger for developing countries. By expanding the regression to a multivariate level to include various other economic and political uncertainty measures, only inflation is highly correlated with instability and is a sound explanator of investment. The political uncertainty measures include political assassinations, revolutions, government crisis, strikes, riots and constitutional changes per year.[8] Additionally the variable *Prob* measures the annual probability of a change in government. This measure was originally estimated from a probit model by Cukierman, Edwards, and Tabellini (1992). Concentrating specifically on the political effect, Pinkyck and Solimano conclude that if interest rates and exchange rates stay stable, political uncertainty has little to do with the return on capital and hence with investment.

[8] Again, some of these measures overlap with the measures used by Barro and were originally created by Banks.

Other policy uncertainty-investment cross section studies exist. Aizenman and Marion (1995) assess a set of 50 developing countries from 1970 to 1993 and find a statistically significant negative correlation between volatility (partly macro induced) and domestic investment. By assuming agents are risk averse, greater weight is put on bad outcomes than on good outcomes. This adds more convexity to the utility function and results in negative growth. Hadjimichael and Dhanshwar (1995) in one of the few studies on sub-Saharan Africa, examine private investment from 1986 to 1992 and conclude that reducing macroeconomic uncertainty stimulates savings and investment. Finally, in another study by Aizenman and Marion (1993) in which domestic investment is irreversible, policy fluctuates between a high and a low tax regime. They show that the volatility of tax rate fluctuations and the persistence of the policy both determine the pattern of growth and investment.

Turning to the traded sector, a few relevant examples arise. Typically, trade variables are used as an explanatory variable when looking at GDP growth. Lensink, Bo, and Sterken (1999) consider export uncertainty along with government policy uncertainty and price uncertainty as exogenous variables and measure their effects on growth in a cross-section of 138 developed and developing countries for the period 1970-1995. They find a robust negative relationship between uncertainty and economic growth. More specifically, the evidence stresses the underlying importance of export stability and policy creation. Levine and Renelt examine the robustness of many similar studies and conclude that not only exports but also imports and other openness figures have a robust impact on per capita GDP growth.

3.3 INDIVIDUAL COUNTRY STUDIES AND UNCERTAINTY

Individual country studies examine policy uncertainty from a number of different angles. Particularly interesting are studies that examine the effects of various political parties or political ideologies on the macro economy. Uncertainty created by the political process can arise from many different aspects of the political system. One of the most fundamental questions associated with this is how different political ideologies fair when comparing economic growth rates. For example, have conservative governments been more successful in creating economic growth than liberal governments? To what extent does policy created by governments with specific ideologies affect the economy? Although the theoretical debate on this subject is extensive, the empirical evidence is lacking. This can be attributed to the difficulty in classifying governments into various ideologies. Strictly defined political ideologies contain elements of subjective opinion due to the unique nature of political dynamics in each country. Political ideology is tailored to the specific cultural, social, and geographic circumstances of each country. Large cross-sectional studies on this topic do not exist. A few examples can be given on a smaller scale involving only one or a few countries. Hibbs (1977), using quarterly time series data, tests the effects of liberal vs. conservative governments from the US and Great Britain on post-war unemployment rates.[9] His evidence suggests more liberal governments in these countries are more successful in driving down unemployment rates compared to their more conservative counterparts. He attributes this to governments pursuing policies that are in accordance with the objectives and interests of their class-defined political supporters. Sun (1992) looks at state-level political ideologies in the 50

[9] In Hibbs' case, liberal governments in the US and Britain refer to Democratic and Labor governments respectively, while conservative governments refer to Republican and Conservative governments respectively.

United States and finds evidence supporting the golden mean, a term used to describe moderation in daily human life. Sun finds that ideologically moderate states performed better than conservative states. Also, liberal states performed better than conservative states. Sun points out that liberal states in the US fall into a moderate category when examined in terms of a world ideological spectrum. Finally, Chatterji (1993) finds that when explaining growth in terms of politics and culture, liberal regimes have the best chance of achieving high growth rates of real GDP per capital. More specifically he finds growth rates in Asian countries with liberal regimes the most successful.[10]

A variety of individual country studies exist looking at the effect uncertainty on the macro economy. These studies do not address the issue of various competing political ideologies. Instead, they measure uncertainty based on a variety of indexes. The numerous approaches listed give an interesting look into how broad the topic of uncertainty can be. An outline of some of the studies is given below in Table 3.2.

[10] Chatteiji's study is more cross-sectional in structure, but is included in the section of individual country studies because its content on political ideology is relevant to comparable studies in this section.

Table 3.1: Review of Individual Country studies on Uncertainty

Author	Country	Conclusion
Fielding (1999)	South Africa	Examines the impact of increased economic uncertainty on the country's capital stock. Fielding found a 1% increase in his macroeconomic instability index led to a 2.3% reduction in the capital stock.
Aronovich (1999)	Argentina Brazil Mexico	Shows that a country's risk premium is determined by many different factors; including the way agents react to imperfect and asymmetric information. Also, negative expectations have a greater impact on lower rated Latin American nation's bonds due to an overreaction to changes in the US dollar interest rate.
Haber, Razo (1999)	Mexico	Examines political instability in Revolutionary Mexico (1990-1934). Their results point to the economic benefits that arose during the political instability of this time. They attribute this to government structures that provide vertical integration to the advantage of elite economic unites.
Forsyth (1996)	Fuji	Examines declining foreign investment in Fuji and attributes it to uncertainty over recent liberalizations that the country has taken.
Park (1995)	Korea	Examines the relationship between inflation and various uncertainty measures of inflation based on the Korean Consumer Price Index over time. Park concludes a positive linear relationship between inflation and uncertainty measures.
Connolly & Rodriguez (1994)	Argentina	Examines monetary stabilization policy in 1979-80 when a pre-announced exchange rate experiment was conducted in Argentina. Empirical evidence suggests central bank reserves as a fraction of M2 is correlated to the arbitrage differentials in favoring Argentina relative to the US.
Dailami & Walton (1989)	Zimbabwe	Examines low investment in Zimbabwe and attributes it to macroeconomic instability caused by strong government intervention.
Solimano (1989)	Chile	Examines the effects of economic instability in a simultaneous equation model for Chile and finds the volatility of the real exchange rate and output has a significant negative effect on private investment.
Dailami (1987)	Brazil	Examines the effects of economic instability in a simultaneous equation model for Brazil and finds the volatility of the real exchange rate and output has a significant negative effect on private investment. The model and the conclusion matched those found by Solimano (1989) when examining Chile.
Nasution (1998)	Indonesia	Reviews the economic crisis in Indonesia caused largely by over-investment in the non-traded sector and manufacturing industries that required high levels of protection. These problems were exacerbated by political uncertainty created by a change in government and lack of sound macroeconomic policy direction.

A collection of individual country studies that look at the policy uncertainty-investment relationship have been collected by Chhibber, Dailami, and Shafik (1992). A wide range of countries are separately examined, including Chile, Columbia, Egypt, Indonesia, Morocco, Turkey, and Zimbabwe. Private domestic investment levels are considered against the backdrop of significant stabilization programs in all of these diverse countries. During the 1980's while private investment showed momentum in some countries, other countries such as Egypt and Zimbabwe appeared to be lagging behind. The reasons for this difference in private domestic investment levels is largely attributed to structural weakness and a legacy of strong direct government intervention.

Other literature also acts as a survey of the theoretical and empirical work focusing on the investment-uncertainty relationship. Rama (1993) presents a collection of 31 empirical studies on investment in developing countries according to their chosen specifications and compares their estimates. Of these 31 studies, all used annual macro data and examined either an individual country or a cross section of countries. Only a handful of the studies capture some level of uncertainty by creating an economic instability measure. Various kinds of economic instability measures used include the standard deviation of the relative price of output over three years, stock market volatility, foreign debt to output ratio, the variance of output over four quarters, and also dummy variables accounting for economic policy changes and uncertainties. Overall, Rama stresses the need for more empirical work on the investment-uncertainty relationship, especially in the area of the political cycle and its effect on investment. The paper stresses the importance of aggregation techniques in an unstable economic environment. Giving relevance to the Lucas critique, unexpected policy changes modify investment

decisions by changing the amount of credit rationing and foreign exchange. Serven and Solimano (1993) review the literature on private investment and macroeconomic adjustment and discuss potential areas of further research. Future potential research areas include the relationship between political regimes and private capital accumulation and the relationship between foreign and domestic investment. The former of these two suggestions is a specific topic of this thesis.

3.4 THEORETICAL TECHNIQUES FOR MODELING UNCERTAINTY

Now turning to the theoretical literature that addresses uncertainty and the macro-economy. Many theoretical techniques have been used to address the topic of uncertainty. Orthodox theory has traditionally used the Net Present Value rule to determine if investment undertaken at a specific period in time would be desirable given the future revenue and costs of a project. In economic terms, this translates into invest until the marginal value of an additional unit of capital is equal to its marginal cost. However uncertainty over expected profits, costs, inflation, taxes, depreciation, and interest rates have led to weak empirical support of this orthodox theory. Both Jorgenson's (1963) user cost of capital theory[11] and Tobin's (1968) q-theory of investment approach[12] have tried to provide more rigorous foundations for the NPV rule. Yet, all of these approaches are based on two assumptions which do not characterize most investment decisions. First, investment is a now or never proposition, the option to wait is ignored. Second, investment is reversible. Reverting these assumptions is the topic of more recent literature on the subject.

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[11] A good description of this approach is given by Nickell (1978).
[12] A good description of this approach is given by Abel (1990).

3.4.1 THE INVESTMENT - UNCERTAINTY RELATIONSHIP:

Hasset and Metcalf (1995) present a model with irreversible investment under uncertainty when prices follow a random walk under a Geometric Brownian Motion and compare these results to when prices follow a Geometric Mean Reversion[13]. Although they find that cumulative investment decreases in each case when uncertainty increases, each modeling critique has its own reservations. Geometric Brownian Motion leads to traceable solutions for investment decisions and its rules are clear and intuitive, but its continuous time random walk process in logs is unbounded above, leading to the unrealistic assumption of infinite profits. While Geometric Mean Reversion has more sound assumptions, but is analytically more complex. Hasset and Metcalf conclude that since little in the way of results is lost using a Geometric Brownian Motion, its unrealistic assumptions can be overlooked in light of its more friendly analytical process.

Other literature shows how the assumptions pertaining to the source of the uncertainty and to the stochastic process[14] of the uncertainty highly affects investment decisions. Hartman (1972), Pindyck (1982), and Abel (1983) all examined the effect of output price uncertainty on the investment decisions of a risk-neutral competitive firm, which faces convex costs of adjustments[15]. Different stochastic specifications pertaining to the price of output in these studies resulted in different conclusions. Hartmann uses a discrete time model where price is random in each period. He finds that with a linearly

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[13] Rigorous explanations of Geometric Brownian Motion and Geometric Mean Reversion can be found in Dixit and Pindyeckk (1994)

[14] For a detailed explanation of stochastic processes see Cox and Miller (1965) and Feller (1971).

[15] Cost of adjustment models were first introduced by Eisher and Strotz (1963), Lucas (1967), and Gould (1968). More recently cost of adjustment models have been used to provide a rigorous foundation for Tobin's (1968) q theory of investment by Yoshikawa (1980) and Hayashi (1982).

homogenous production function higher levels of output price uncertainty leads to a competitive firm investing more. While Pindyck, using a continuous-time model where the current price is known but the future prices are stochastic, shows higher levels of output price uncertainty increases investment only if the marginal adjustment cost function is convex. If the marginal adjustment cost function is concave, then greater output price uncertainty decreases investment.

3.4.2 TIMING ISSUES, POLICY UNCERTAINTY, AND INVESTMENT LEVELS

Timing issues can be crucial to sustaining a growth strategy that is dependent on capital investment. A "Catch 22" effect may arise[16] where growth is dependent on investment, but capital owners are waiting to see if growth and policy reform take place first. This is similar to what is seen in Rodrik's model which is developed in detail in Chapter 4. Some developing country research on the subject has focused on whether expected policy changes affect levels of foreign and domestic investment. Rojan and Marwah (1998) develop a model to explore what influences foreign direct investment on a micro level. In particular what role does policy uncertainty play for risk neutral firms in developing countries who have the option to undertake irreversible investment. The authors conclude that a wait-and-see strategy is optimal. Cohen and Maloney (1991) focus on the traded sector and how future policy uncertainty can cause exporting firms to hesitate before doing business in a country.

Interesting research has been done by Klein and Marion (1994) who take a somewhat different approach to policy uncertainty by making it an endogenous variable.

[16] A "Catch 22 effect" has been discussed by Laban and Wolf (1995) with regards to Eastern Europe privatization and by Rodrik (1996) in regards to foreign investment.

Their work describes the trade off between a misaligned exchange rate peg and the potential for greater policy uncertainty if a realignment is considered or enacted. Clearly, the timing of the exchange rate realignment which will bring the smallest amount of uncertainty is a crucial policy decision, and to accomplish it optimally can be a difficult task.

Another way to consider timing issues is to compare investment under uncertainty to financial call and put options. This is done by Dixit and Pindyck (1994) and by Able, Dixit, Eborly, and Pindyck (1996). A firm with the potential to investment has the option to spend money (the exercise price), now or later, in return for an asset (e.g. a project) of some value. As with the financial call option, the option to invest for a firm is valuable partly because the future value of the asset obtained by investing is uncertain. If the asset increases in value, the payoff from investing rises. If the asset falls in value, the firm can decline from investing and will only lose what it initially spent to obtain the investment opportunity. A put option works in a similar fashion but from a seller, instead of a buyer's, perspective.

3.4.3 POLICY UNCERTAINTY AND THE POLITICAL BUSINESS CYCLE

Related to the topic of policy uncertainty and investment levels is that of the business cycle. To what extent can policy makers influence the business cycle to fit their own agenda and timing concerns is an core question of political economy. Literature on political and economic cycles has evolved from traditional models which support policy makers being able to operate along an exploitable Phillips[17] curve to models which incorporate the theory of rational expectations in which a rational public better anticipates

[17] The classic article on this topic is by W.A. Phillips

policy makers moves, thereby limiting their effectiveness. A common theme which exists through this evolution of models is the question of whether politicians act in an opportunistic or in a partisan manner. Opportunistic models stress that government policy is determined by the governments main objective – to win re-election, while partisan models stress that government policy is determined by the desire to implement party ideology into legislation. The mid 1970's saw the macro economy being explained by an exploitable and predictable Phillips curve. Nordhaus (1975) and Lindbeck (1976) stress governments opportunistic ways by choosing levels of unemployment and inflation that will be least offensive to voters and therefore maximize the governments odds of re-election. In this case, policy makers have no policy preferences of their own. Hibbs (1977) in contrast emphasizes policy makers ideological partisan ways. Policy makers will choose levels of unemployment and inflation which best conforms to party platforms, with right wing parties emphasizing low unemployment as the top priority and left wing parties emphasizing low inflation as their top priority.

By the mid 1980's with weak empirical support being given to the Phillip's curve, rational expectations became a dominant view with which to view the macro economy. This method was pioneered by Kydland and Prescott (1977) and Borro and Gordon (1983) by adopting a game theory approach to explain how a rational public limits the extent to which political decision making influences the business cycle. Cukierman and Meltzer (1986), Rogoff and Sibert (1980), Rogoff (1990) and Persson and Tabellini (1990) developed models with rational expectations and opportunistic decision making on behalf of policy makers. Alesina (1987) developed a rational expectations model with partisan decision making on behalf of policy makers.

3.5 CONCLUSION

Quite clearly, the empirical literature on the topic of policy uncertainty and the macro economy is broad. When specifically looking at policy uncertainty generated by the political process, the research is lacking. Since policy uncertainty in the research presented in this paper is based on two political variables that haven't before been proxied on a large cross-sectional basis, exact examples of research exactly like what is presented here doesn't exist. This point emphasizes the important contribution the data set in this study contributes to the work in this area. Nevertheless, studies on similar topics of policy uncertainty are frequent, and therefore fall into the same broad category as the work performed in this paper. This section has shown how the research done in this thesis fits into the bigger picture of existing research.

Next, chapter 4 provides the theoretical basis for the model being used in this paper. Chapter 5 then introduces the model.

CHAPTER 4

THE THEORY OF THE IMPACT OF THE POLITICAL ECONOMY

4.1 INTRODUCTION

The relationship between policy uncertainty and the macro economy is a subject of increasing importance in economics. Existing literature approaches the topic from both the firm level and an aggregate level. In this chapter, the theoretical basis for the model presented in the following chapter will be explored. It is a model developed by Rodrik and deals specifically with policy uncertainty and private investment in developing countries. Using a simple linear formula, it demonstrates how policy uncertainty acts as a tax on investment. According to Rodrik, the equations are deliberately vague. This allows the uncertainty in the model to be founded from a variety of sources, including uncertainty generated by the political process. This is followed by a brief discussion highlighting Mexico as a recent example of how policy uncertainty acts as a tax on investment.

4.2 POLICY UNCERTAINTY IN AN UNCERTAIN ENVIRONMENT

Rodrik (1991) links policy uncertainty to levels of aggregate private investment and shows how moderate levels of policy uncertainty can as a tax on investment. Rational investors must react to reform signals, especially when they are on a micro-economic level. But the decision to invest is put off until uncertainty regarding the long-term sustainability of the reform subsides. This particular model is relevant to empirical

analysis done this paper. A theoretical model developed by Rodrik demonstrates the trade-off between stability and reform. A collection of eight linear equations show how the size of reform is judged in a manner that estimates the probability of sustainability of the reform. Hence, reform itself is not enough. A credible long-term commitment to reform must be perceived on behalf of capital owners. The model shows how even a subjective probability of reform collapse can jeopardize otherwise sensible reform.

In a pre-reform environment, an entrepreneur's return from capital is $r\text{-}t_0$, where r is the marginal product of capital and t_0 is the policy induced distortion. In other words t_0 is an explicit tax. An example of such a distortionate policy can be an import-substitution program. The point of reform is to reduce t_0 to t, where $t < t_0$. The variable r^* represents the marginal product of capital in an alternative environment; this can either be in other sectors of the economy or the return on foreign assets. Before policy reform, $r\text{-}\ t_0 \leq r^*$. [18] According to Rodrik, the equations are deliberately vague. The intention of policy reform is to move capital to a more desirable sector or to encourage repatriation of domestic capital from capital flight. A more desirable sector could be an export-orientated sector over an import-substitution sector. Policy uncertainty, π, measures the probability of a policy reform reversal. In such a case, we assume t reverts back to t_0, the pre-reform level of distortion. It is important to note that private investment is looked upon as being partially irreversible due to the sunk costs capital incurs when it is moved from one sector to another.

First, the model first looks at the investment decisions of a risk-neutral individual when reform is undertaken. Second, the model looks at individual investors as a whole

[18] Normally, diminishing returns would require the two sides of this inequality to be equal. But, as will be demonstrated, the difference in the two returns is allowed once hysteresis is considered.

and develops an aggregate approach to determine how aggregate investment reacts to policy reform and policy uncertainty. A good starting point is to presume that before policy reform an individual has one unit of capital overseas where it earns r^* and has no uncertainty. With the undertaking of policy reform, the investor has to decide whether to keep the capital overseas or to move it back into the domestic economy where it would earn a return r-t. A discount factor of ρ must also be considered. If the investor decides to keep the capital overseas when domestic policy reform is announced, the discounted value of the first option is

$$(1) \qquad V_0 = r^*/\rho \ .$$

The subscript 0 represents the scenario where the investor does not change behavior despite the reform in the domestic economy. In this case, since the investor decides not to move the capital when policy reform is announced, there is no need to consider a situation of whether the investor will move the capital back overseas when and if policy reform collapses. The alternative option to the investor is to move the capital back into the domestic economy once policy reform has been put into place. In such a case, V_1 represents the maximum value of the moved capital under the policy reform environment. V_1^R represents the maximum value of the moved capital if the policy reform environment is abandoned at a later date. If policy reform is initiated but then subsequently abandoned by the government, the loss to capital owners who chose to move their capital from the foreign market into the domestic market once the policy reform was originally initiated is:

$$[V_1 - V_1^R] \ .$$

In such a case, V_I equals the expected flow of benefits plus the expected loss. In equation terms this becomes:

$$V_I = (r\text{-}t) + [V_I - V_I^R] .$$

Factoring in both the probability of policy reform abandonment and the discounting term, the equation becomes:

$$V_I = \{(r\text{-}t) - \pi[V_I - V_I^R]\}/\rho , \qquad \text{which yields}$$

$$\textbf{(2)} \qquad \mathbf{V_I = (\rho + \pi)^{-1} [(r\text{-}t) + \pi V_I^R]}$$

The next step is to determine the value of V_I^R. Assume once there is a policy reform reversal, policies do not change again. To determine the value of V_I^R, exit and entry costs need to be factored in. Entry costs are represented by ε and exit costs are represented by θ. In light of a policy reform reversal, capital owners who originally switched their capital from the foreign marketplace into the domestic marketplace will switch their capital back overseas (or possibly into another sector) if

$$r\text{-}t_0 < r^* - \rho\theta$$

The decision whether to switch capital will depend on how large the policy reversal is and on the size of the re-founded policy uncertainty tax of t_0. Here, $\rho\theta$ represents the flow value of exit costs. The capital owner must determine if a small or a large policy reversal has occurred.

$$\textbf{(3)} \quad \mathbf{V_I^R = (r\text{-}t_0)/\rho} \qquad \text{if } t_0 \leq (r - r^*) + \rho\theta \qquad \text{(for small reversals)}$$

or

$$\textbf{(3')} \quad \mathbf{V_I^R = (r^* / \rho) - \theta} \qquad \text{otherwise} \qquad \text{(for large reversals)}$$

Now substituting into equation (2):

$$(4) \qquad V_1 = (\rho + \pi)^{-1} [(r\text{-}t) + \pi \max \{ (r\text{-}t_0)/\rho, (r^* / \rho) - \theta \}]$$

Now what will it take for capital owners to transfer their capital from the overseas investment back to the domestic economy when policy reform is implemented? Essentially, this will happen when the net gain of doing so is positive. The "trigger" level for determining whether capital will be moved back to the domestic economy is defined by

$$(5) \qquad V_1 \geq V_0 + \varepsilon$$

Hence, at the time of the policy reform, capital is currently earning a return of V_0. As long as V_0 is less than the domestic return minus the cost of entry, capital will move. For now, assume the policy reform reversal is large. When equations (1) and (4) are substituted into equation (5), the outcome is

$$(6) \qquad (r\text{-}t) - r^* \geq \pi(\varepsilon + \theta) + \varepsilon\rho$$

or

$$t \leq (r\text{-}r^*) - \varepsilon\rho - \pi(\varepsilon + \theta)$$

According to Rodrik, 'this is the central equation which links the entrepreneur's response to the magnitude of the reform, the ex-ante probability of sustainability, and the magnitude of capital irreversibilities (entry and exit costs)'. The policy uncertainty tax, t, must be low enough so that the return to domestic investment is greater than the alternative return to investment, either overseas or in an alternative sector. The three right hand side terms in order from left to right represent the difference between the domestic return and the overseas return, the one-time cost of capital relocation, and the cost of the probability of policy reversal.

Unless the policy reform is sufficiently large and the cost of the probability of a reversal are sufficiently small, desired investment will not be forthcoming. In order to improve the after-tax domestic return to capital, the government can provide a subsidy to offset the policy uncertainty tax. The size of the subsidy will depend on both the exit and entry costs entrepreneurs incur when capital is switched to an alternative use and on the probability that entrepreneurs will indeed switch their capital to an alternative use in light of a policy reversal. For example, if $\varepsilon + \theta = .75$, meaning that sunk costs of capital are $3/4^{th}$ of the cost of investment and there is a 10% chance of a policy reform reversal, than $\pi(\varepsilon + \theta)$ will become $.10(.75) = .075$ or 7.5%. This is the amount the government would have to provide in terms of a subsidy in order to offset the policy uncertainty tax[19]. The only practical way the government can do this is by offering a substantial domestic real interest rate premium over foreign interest rates. A domestic real interest rate premium of 7.5% over foreign interest rates is substantial, as it is typically two to three times as large as typical real interest rate premiums. A 20% probability of a policy reform reversal would call for a 15% premium of domestic interest rates over foreign interest rates.

In the case of small reversals, the expression becomes: [20]

(6') $\quad t \leq \{ (r-r^*) - \varepsilon\rho - [\pi / (\rho + \pi)]t_0 \} [1 + \pi/\rho]$

---

[19] Sunk costs counting for $3/4^{th}$ of the capital investment is reasonable considering industry specific machinery needed for most manufacturing today.

[20] In equation (6'), I differ from the equation presented by Rodrik in his development of this model. Rodrik presents equation (6') as $t \leq \{ (r-r^*) - \varepsilon\rho - [\pi / (\rho + \pi)]t_0$. Rodrik's version of (6') neglects the additional factor $[1 + \pi/\rho]$. I find no grounds why this factor should be neglected and therefore include it in my explanation of Rodrik's model. This point does not change the basic conclusion of the model.

4.2.1 AGGREGATE INVESTMENT WITH POLICY UNCERTAINTY

These investment equations can be combined in order to determine the level of aggregate investment in the case of policy reform and policy uncertainty. Assume N investors, each with one unit of capital. If all investors had the same behavior, aggregate investment would be either 0 or N. More realistically, entrepreneurs have different thresholds for investing their capital. This threshold will be measured according to an index of entry costs, $\varepsilon \in [0,\infty]$. Here, ε has a value based on the probability distribution function $f(\varepsilon)$. Also, in a general equilibrium situation, the differential in the marginal product of capital is a decreasing function of the amount of capital that is relocated. Therefore,

$$r\text{-}r^* = \Delta(I), \qquad \Delta' < 0,\ \Delta'' < 0$$

We can get the equation:

$$(7) \qquad \varepsilon^* = (\rho + \pi)^{-1} [\, \Delta(I) - t \cdot \pi\theta]$$

Here, a large reversal has been used. All investors with entry costs below ε^* will invest their capital. In other words, ε^* is the cut-off point for which equation (6) will hold. Now, after all the groundwork has been done, the aggregate investment equation becomes.

$$(8) \qquad I = N \int_0^{\varepsilon^*} f(\varepsilon)\, d\varepsilon$$

Here, equation (8) represents the level of aggregate investment that will be forthcoming when policy reform is undertaken. Again, this investment can come from capital that had previously been invested overseas, or it can come from capital that had been previously invested in other less-desirable sectors of the domestic economy.

To verify the conclusion drawn from these equations, it can be confirmed that I decreases as π increases.[21]

$$dI / d\pi = N f(\varepsilon^*)\, d\varepsilon^*/d\pi$$

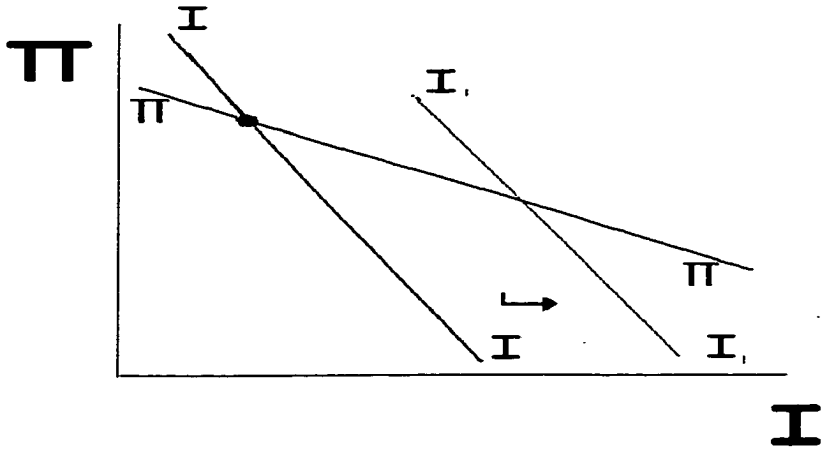
$$= -N f(\varepsilon^*)\, (\varepsilon^* + \theta) / [(\rho + \pi) - N f(\varepsilon^*)\, \Delta']$$

$$< 0.$$

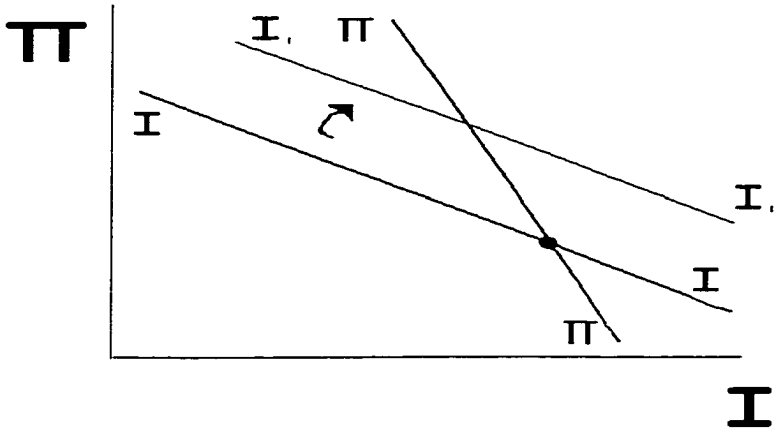
There is a downward sloping investment function. A decrease in the policy uncertainty tax t will shift the Aggregate Investment curve to the right. Figure 4.1 demonstrates the trade off between increasing Aggregate Investment and decreasing the cost of the probability of a policy reversal. Figure 4.1 is featured below.

[21] For a more detailed mathematical explanation showing that $dI / d\pi < 0$ see Appendix B.

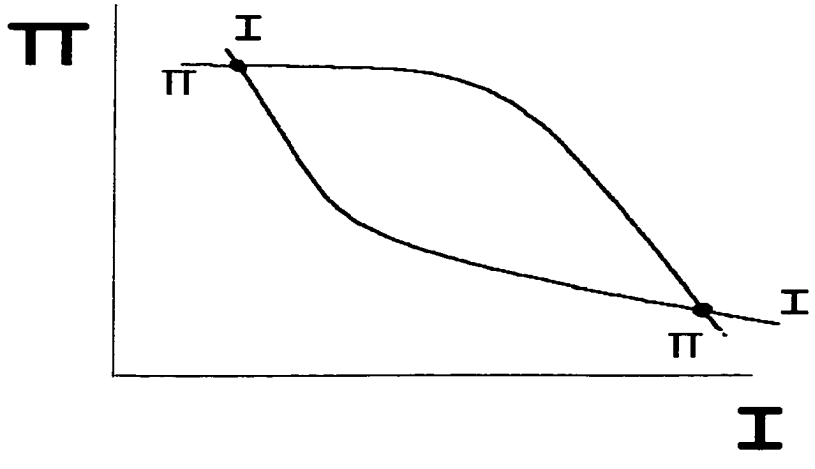
Figure 4.1 Aggregate Investment Levels and the Probability of Policy Reform Reversal: An illustration.



(a) Successful Policy Reform. A reduction in policy induced distortions (*t*) shifts out the aggregate investment curve. As a result, aggregate investment (I) increases, and the probability of a policy reform reversal (π) decreases.



(b) Unsuccessful Policy Reform. A reduction in policy induced distortions (*t*) shifts out the aggregate investment curve. As a result, aggregate investment (I) decreases, and the probability of a policy reform reversal (π) increases.



(c) Multiple equilibria. Pessimistic expectations overshadow otherwise sensible policy reform.

Figure 4.1 shows three different scenarios of the trade off between investment and the probability of a policy reform reversal. In all three cases a reduction in t leads to a shifting out to the right of the downward sloping investment function. As a result of this, the equilibrium level of I and π move in opposite directions. Up until this point, π has been treated as an exogenous variable. Realistically, the value of π will depend on the success of the policy reform iniative. Therefore π is a function of I. Investors must be convinced of the soundness of the reform measures. The government must demonstrate their competence in growth orientated policy making in order to convince entrepreneurs to alter their investment behavior. This is in line with a rational expectations view. Before making largely irreversible investments, entrepreneurs will use a wait and see attitude in order to adjust to the new policy environment. This approach endogenizes the probability of a policy reversal and thereby expands the extent of the model introduced above. The three different scenarios from Figure 4.1 are as follows.

(a). *Investment increases and the probability of reform reversal decreases,* $\pi = \pi(I)$, $\pi'(\bullet) < 0$ In this case, shifting out the investment response results in an increase in I and a decrease in π. This is the result of a successful policy reform iniative. The greater the investment response, the more entrepreneurs will have a vested interest in seeing the reform policies continue into the future. In other words, the more investors change their behavior in response to policy reform, the more they have to loose if the reform is abandoned. Hence, these entrepreneurs will channel their efforts in a manner that will reduce the possibility of policy reversal. For example, if entrepreneurs move their capital into a newly created export sector, they will lobby the government in favor of outward-

oriented policies like trade liberalization and realistic exchange rates. This will give greater political support to continue the reform policies.

(b) *Investment decreases and the probability of reform reversal increases,* $\pi = \pi(I)$, $\pi'(\bullet) < 0$ Here, a reduction in t again shifts out the investment function outward to the right, but the new equilibrium has a lower level of investment and a higher probability of a policy reform reversal. The desired increase in investment that the government policy reform hoped to generate never materialized. Instead, the higher probability of reform abandonment caused investment to actually decrease, instead of increase. This can happen when trade liberalization worsens the current account. Also, if the exchange rate is targeted according to the inflation rate instead of the external balances, a macro stabilization program may also hurt the current account and reserves. When this happens, a country may have no other option than to abandon the reform policy measures.

(c) *In the third scenario, multiple equilibria are a possibility.* Here both scenarios (a) and (b) described above are combined. Higher investment rates with lower probability of policy reform abandonment is seen, while lower investment with higher probability of policy reform abandonment is seen. If investors choose to base their decision whether to move capital in the light of policy reform on a rather ad hoc random basis, pessimistic expectations may overshadow otherwise sensible reform policy.

4.3 IMPLICATIONS FOR THE POLITICAL ECONOMY

The above model demonstrates the trade-off between policy reform and stability. Just because policy reform is implemented, there is no guarantee that the reform will last. Whether the situation is post-apartheid South Africa, privatization efforts in Turkey, currency reform in Mexico, or inflation control measures in Argentina, the fact that these reforms are undertaken does not automatically convince capital owners that the reforms will be either successful or permanent. In South Africa, after a significant change in government with the first democratic elections in 1994 which brought the socialist African National Congress into power after decades of an undemocratic minority conservative government, uncertainty over whether the political economy forces that supported the conservative government would resurface created doubt as to the sustainability of the policy reform measures that were undertaken by the new government. Also, when new economic policy is undertaken, it has a chance of leading the economy into unexpected waters. For example, an unforeseen consequence of capital account liberalization taken in Argentina in the early 1990's was a capital inflow that brought inflation to the country. Conventional thought was that with capital account liberalization, a country would first be wary of a potential capital outflow. Many countries did experience a capital inflow instead of a capital outflow once capital liberalization measures were undertaken.

The model represents a double edge sword. Investment is crucial to the growth and development of most Third World countries. With many developing countries being heavily in debt, new policy reform iniatives must be undertaken in order to generate this much needed investment. Unfortunately for these countries, what we see here, is that

even structurally sound reform measures produced by the government are not enough to generate the much needed investment. Rather, what is needed is both structurally sound reform measures and a belief by entrepreneurs that these new policies are good for growth. The government must be perceived to have the competence and commitment to continue to foster reform policies in the future. This competence and commitment does not come automatically. Investors will reserve their judgment until they feel confident that their capital investments, which are largely irreversible, will provide the expected rate of return in the future. The double edge sword is that reform measures may fail because entrepreneurs are waiting until their own uncertainty subsides. But judgment period in itself will be detrimental; the longer investment is not forthcoming, the larger is the probability that the reform measures will not work.

Within the context of this study, two different measures derived from the political economy are considered as two sources of uncertainty that can contribute to a lack of forth-coming investment despite policy reform. This uncertainty delays investment and increases the probability of policy reform. One type of uncertainty can result from a new government coming to power. In such a case, capital owners may choose to exercise a wait-and-see attitude in order to evaluate the soundness and sustainability of future policy direction. Since a large portion of capital investments are irreversible, a sufficient degree of certainty needs to be had in order for the investment to go forward. Entrepreneurs must believe the new government's policies will be good for growth and that the new government will live up to its responsibility to oversee and maintain an honest, efficient marketplace where calculated risk taking will be properly rewarded. A second type of uncertainty that is derived from the political process is uncertainty from various

ideological philosophies that political parties hold. When a new government comes to power, how entrepreneurs react to shifting ideologies is crucial for investment. Entrepreneurs may perceive one ideology as being more competent and better for growth than another ideology. Therefore the more favorable ideology would be perceived as being surrounded with a smaller amount of uncertainty.

Mexico's example

For example, the historic Mexican elections in the year 2000 saw the ruling PRI party voted out of office after 71 years in power. The PRI, which has its ideological roots in socialism but has more recently moved to the center of the ideological spectrum as a result of various privatization measures and other free market reforms, has been replaced by a more conservative PAN party. PAN has promised to root out systemic corruption that has become embedded in the Mexican economy and as a result has hampered business. A fairer, less corrupt Mexico can better move ahead privatization efforts and promote business friendly policies that will have a better chance of promoting much needed growth and development in Mexico. Therefore, in this case, more confidence is perceived on behalf of the Mexican population in a more conservative, less corrupt, government. Nevertheless, speculation brings light that the new PAN president will have only minority support in the senate, creating nervousness about the ability of the PAN president to pass credible policy reform. Again, investors will wait and see how the two competing forces in the Mexican government are able to get along. When investors feel a fair and accurate judgment can be made in the ability of the new government to legislate policy reform, capital investment will be forthcoming.

4.4 CONCLUSION

The role of uncertainty can not be ignored in macro-economic models. Albiet, it is an abstract concept and can be difficult to model. This would explain the extensive evolution of techniques used to address the topic. Policy uncertainty created by the political process has been the main focus of the model originally developed by Rodrik and used in this chapter.

Overall, the background work for the model developed in this dissertation has been thoroughly explained in chapters 1-4. Now we are ready for the model itself in chapter 5.

CHAPTER 5

THE POLITICAL ECONOMY OF DEVELOPING COUNTRIES: AN EMPIRICAL ANALYSIS

5.1 RESEARCH DESIGN AND FORMULATION OF HYPOTHESIS

The theory of the effects of uncertainty indicate that policy uncertainty generated by the political process will have negative consequences on the macro-economy. As the literature reviewed in Chapters 3 and 4 suggested, capital owners will cautiously judge changes in policy in order to best determine how these changes will effect the business environment. These ideas directly relate to the hypothesis developed in this dissertation. As previously explained, this dissertation examines two related questions. The first question examines how policy uncertainty created by a change in the head of state of a country affects per capita GDP, investment, and trade. The second question examines how policy uncertainty created by the political ideology of the government affects per capita GDP, investment, and trade.

The approach to these questions is based on a rational expectations view of the economy. This is in contrast to the Phillip's curve approach, which dominated the macro economic debate in the 1970's. With the Phillip's curve, policy-makers are able to manipulate levels of inflation and growth to suit the timing of their political objective. Although by the mid 1980's, with weak empirical support for the Phillip's curve, rational expectations became a dominant theory with which to view the macro economy. Here, a rational public limits the extent political decision-making influences the business cycle.

This view discredits the Phillip's curve by suggesting that a political party in power cannot induce high levels of GDP and low levels of unemployment before an election and the opposite after an election. Instead, rational investors correctly perceive what is going on around them and make decisions that maximize their own utility, not the utility of the incumbent government wanting to remain in power. But in order for capital owners to maximize their utility, while working in an economy that exists within the legal framework of the country, capital owners must take note of government policies that affect the present and future rate-of-return on capital. Policies that affect asset returns are diverse; ranging from fiscal and monetary policy, to market structure regulation, to international trade laws, to name just a few. When capital owners begin to suspect that a change in government in the near future is a significant possibility, they adapt to this situation by invoking a wait-and-see attitude so that they can incorporate the effects of future policy changes into their plan to maximize their own utility. This wait-and-see attitude will remain until capital owners can once again feel confident that policy changes that affect them are correctly on track. They will wait until they are satisfied with the signals the new government gives indicating its commitment to maximizing growth potential in the future.

In conjunction with these views, it is expected that the policy uncertainty that is created as a result of a new government coming to power causes GDP to decrease. The extent of the decrease is in line with the amount of uncertainty created. This is consistent with Barro, who concludes that average growth rates are positively related to political stability. One new government in power during a calendar year is expected to foster less uncertainty than if there were two or more new governments in power in a calendar year.

Two or more changes in one year signals a larger amount of instability and a potentially greater need for reform and change in the country.

In line with looking at the uncertainty effect of a new government in power is the interrelated question of what kind of uncertainty is created by different government ideologies. It is hypothesized here that an extremist government, either right-wing military government or left-wing undemocratic communist government would create the most amount of uncertainty.[22] This would be due to the usually undemocratic nature and the extremist elements of these governments. Extremist governments that impose their authority and will on otherwise self-enforcing institutions create large commitment problems. In a legal context, this means that governments powerful enough to abrogate property rights may do so for their own benefit. In an economic context, this means levying high taxes or inflating the money supply to finance the government's military and political adjendas. Therefore, a credible commitment to growth and an efficiently functioning marketplace can not be expected by extremist governments who engage in predatory behavior. This uncertainty would again cause capital owners to develop a wait-and-see attitude and create a decrease in per capita GDP. Alternatively, right-of-center governments, generally conservative in nature, would create the least amount of uncertainty of any other ideology due to their free-market orientation. Their limited government approach to due process and universal individual political and economic rights through respecting self-enforcing institutions are expected to re-assure capital owners and provide the political foundations for economic growth. This allows capital owners to exercise the greatest amount of freedom in controlling the worth of their

[22] The present general consensus on the uncertainty effect of various political ideologies presented in this paper is supported by numerous authors such as North (1981), Levi (1988), and Weingast (1997).

capital. And this in turn creates the incentive to maximize efficiency. Along the same line of argument, centrist governments, with generally a greater amount of government involvement in the economy, would be expected to foster more uncertainty than right-of-center governments. Finally, left-of-center governments, generally being social democratic in nature, would generate more uncertainty than centrist governments. The social responsibility taken on by socialist governments would be expected to cause a great deal of government interference in the economy, thereby infringing more heavily on the autonomy of capital owners.

The strong correlation between investment and GDP indicates that investment would have the same negative reactions to policy uncertainty generated by the political process that GDP would experience. This is a primary point of Rodrik's model (that was extensively explained in the previous chapter) which links policy uncertainty to levels of aggregate private investment and shows how policy uncertainty can act as a tax on investment. The decision to invest is put off until the uncertainty regarding the long-term sustainability of reform subsides.

In the traded sector, Cohen and Maloney (1991) focus on how policy uncertainty can cause exporting firms to hesitate before doing business in a country. International trade is always accompanied by international finance. Uncertainty over future capital flows for international payments and uncertainty regarding future policy on an open door to the global marketplace can alter the flow of business for both exporters and importers. Therefore, a decrease in the openness (exports + imports) of a country's economy is expected in the presence of new governments. When new governments are too frequent, the uncertainty signaled by these events becomes an even greater threat to the ability of

domestic firms to export and for firms abroad to be willing to import into the country with the unstable political environment. How openness reacts to various ideologies of ruling political parties, the same results are expected as were predicted with GDP and investment. An extremist government is predicted to cause the most uncertainty. A right of center government is expected to cause the least amount of uncertainty. A centrist government would cause more uncertainty than a right of center government and finally a left of center government would cause more uncertainty in the traded sector of the economy than a centrist government.

To summarize, my main interest in this study lies in the above effects of new governments, extremist governments, right-of-center governments, centrist governments, and left-of-center governments and their implications for per capita GDP, investment, and openness. In essence, the theory predicts that the presence of a new government will cause per capita GDP, investment, and openness in the traded sector to decline. Also, extremist governments will have the worst impact on the economy. In terms of per capita GDP, investment, and openness, right of center governments will have the best effect, followed by centrist governments and finally by left of center governments. The data definitions and sources are introduced in the next section.

5.2 DATA DEFINITIONS AND SOURCES

This section focuses on the data used and the measurement issues associated with this study. First, I describe the data set and its construction. Second, I discuss the techniques used to measure the variables and review the data sources.

5.2.1 VARIABLE NAMES AND DEFINITIONS

In order to investigate the effects of new governments and government ideology on the macro-economy, time series data were gathered from different sources for the period 1960 to 1992 for 42 developing countries. Both political and economic aspects of these countries were captured. The 42 countries are from three distinct regions: Asia, Latin America and the Caribbean, and finally Africa. A list of these countries by region is provided in Appendix A.

Tables 5.1 and 5.2 provide names, definitions, and summary statistics on all variables in the data set for all the years covered in the survey. Table 5.1 reviews the economic variables while Table 5.2 reviews the political variables. The variables of interest in this study are the political variables. The economic variables play a critical role in correctly specifying the simplified equations used to test the hypotheses. This point is discussed in detail in Section 5.3.

Table 5.1: Variable Definitions & Descriptive Statistics: Economic Variables

Variable Name	Variable Description	Mean	Std. Dev.	Max	Min	Mode	Median
GDP	Real GDP per capita (1985 IP)	2345	1726	12653	445	902	1819
CGGDP	Change in real GDP per capita (1985 IP)	.021	.06	.67	-.474	0	.22
INV	Real Investment share of GDP [%] (1985 IP)	14.78	7.43	42	-4.5	15.9	14.5
CGINV	Change in real Investment share of GDP (1985 IP)	-.015	.213	2.98	-3.49	0	.014
OPEN	Openness: (Exports+Imports)/ Nominal GDP	52.58	47.69	423	4.99	51.22	45.54
CGOPEN	Change in OPEN	-.019	.156	2.14	-.564	0	.003
POP	Population (in millions)	61.13	168	1016	1.145	4.13	12.96
CGPOP	Change in Population	.025	.011	.143	-.173	.019	.025
CON	Consumption as a % of GDP	70.16	11.72	114.5	33	72	70.3
CGCON	Change in Consumption	-1.05 E-03	5.09 E-02	.84	-.244	0	-.0023
INCOME	Initial 1960 real income	1558	1146	6338	567	567	1195
SECED	Initial 1960 enrollment in secondary school	14.17	9.94	33	2	6	10
PRICE	Price level index (PPP GDP / $US exchange rate)	56.46	37.43	771	16.75	53.18	51.77
EXC	Exchange Rate of local currency per US $	68.01	196.0	2029	9.08 E-14	1	3.722

Notes: 1. All changes are in percent terms. 2. Sample size is 1344. 3. SECED represents the initial 1960 enrollment in secondary education per 100 people in the appropriate age category.

Table 5.2: Variable Definitions & Descriptive Statistics: Political Variables

Variable Name	Variable Description	Mean	Std. Dev.	Max	Min	Mode	Median
GOVTIME	The amount of time the government has been in power.	5.4	5.3	33	.2	1	4
NEW-GOVA	Dummy Variable: 1 = one change in government in a calendar year, 0 = otherwise	.152	.36	1	0	0	0
NEW-GOVB	Dummy Variable: 1 = two or more changes in government in a calendar year, 0 = otherwise	.026	.15	1	0	0	0
IDEOLA	Dummy Variable: 1 = Right-of-Center Govt., 0 = otherwise	.322	.467	1	0	0	0
IDEOLB	Dummy Variable: 1 = Centrist Govt., 0 = otherwise	.142	.35	1	0	0	0
IDEOLC	Dummy Variable: 1 = Left-of-Center Govt., 0 = otherwise	.20	.39	1	0	0	0

Notes: Sample size is 1344

5.2.2 VARIABLE MEASUREMENT AND SOURCES OF DATA

The main variables used in this study are growth in per capita GDP, change in investment as a percentage of GDP, change in openness, new governments (NEWGOVA & NEWGOVB), and government ideology (IDEOLA, IDEOLB, IDEOLC). The first three variables listed represent the main economic variables of interest and are the

dependent variables. The later two variables represent the main political variables of interest.

The economic variables, collected on an annual basis, are mostly from the Penn World Tables.[23] The Penn World Tables provide high quality statistical information on most countries. The strengths of this database include its quality, the comparability of the data across countries, and its historical depth. All variables here are in real terms, calculated by using 1985 International Prices (1985 IP). The concept of an international price is developed by the authors of the Penn World Tables and represents a basket of prices from dozens of countries. The only economic variables not collected from the Penn World Tables are SECED and EXC. SECED represents the initial 1960 enrollment in secondary education per 100 people in the appropriate age category. This variable comes from the United Nations Statistics. EXC is the exchange rate per US dollar and is from the World Bank Statistics.

The political variables of interest, also collected on an annual basis, have been obtained from various sources and transcribed into an ordinal classification system. This allows the information to be incorporated into a dataset suitable for econometric analysis. In order to capture the presence of a new government in power, the dummy variables NEWGOVA and NEWGOVB have been created. NEWGOVA captures the effect of one new government in the calendar year. NEWGOVB captures the effect of two or more new governments in the calendar year. The omitted classification is no change in government during the calendar year. The use of two separate dummy variables for the

[23] The Penn World Tables are also known as the Summers-Heston data. It is based on a paper by them called *The Penn World Table (Mark 5): An expanded Set of International comparisons, 1950-1988* which appeared in the Quarterly Journal of Economics in May 1991.

presence of a new government in power is necessary because each dummy variable assumes a different degree of policy uncertainty. Two or more changes in government in one year are expected to create more policy uncertainty than one change in government in one year. One change in government in one year is expected to create more policy uncertainty than zero changes in government in a calendar year. All dates on new government administrations assuming power have been collected from a source authored by Roberto Ortiz de Zarate called *Political Leaders 1945-1997.*[24] This on-line source gives names, dates, and notes concerning chiefs of state, prime ministers, presidents and other related offices for most countries of the world from 1945 to 1997. All dates given have been cross-referenced with the CIA World Factbook and the Political Handbook of the World.

The ideology dummy variables (IDEOLA, IDEOLB, IDEOLC) have been created to capture the separate effects of various ideologies held by governments in power. In short, IDEOLA represents right-of-center governments, IDEOLB represents centrist governments, and IDEOLC represents left-of-center governments. The omitted classification is extremist governments, which covers both extreme right wing and extreme left wing governments. The classification system is based on a European context, simply because one unifying standard was needed to ensure continuity. Assigning governments into categories is based on classifications already assigned to political parties from the Political Handbook of the World in conjunction with the Worldwide Directory of Political Parties and the CIA World Factbook.[25] Like the variables representing new governments in power, the information on government

[24] The address for this website is http://personales.jet.es/ziaorarr/
[25] A full list of sources is given in the appendix.

ideology has been transcribed into a classification system using dummy variables that is suitable for econometric analysis. Today, there is a broad array of political ideologies. Many party labels cannot be used in an international context. For example, the Japanese Liberal Democratic Party might be liberal in Japan, but isn't liberal in an international spectrum of political parties. Also, there are parties that avoid using labels that imply an ideological classification. In these cases, parties were fit into the classification system based on European standards. The ideological classification system used in this study is described in detail in Table 5.3.

Table 5.3: Ideological Classifications Used in This Study

Right-of-Center Governments (IDEOLA): Right-of-center is used to describe conservative governments and governments with religious values, without being religious fundamentalist. Applicable labels include democratic conservative and Christian-democratic. Democratic conservative governments adhere to traditional values in combination with free-market ideology and law-and-order positions. Christian democratic governments are based on a Christian foundation. Values of other world religions may also be the basis for the government ideology depending on the region and culture of the particular country.
Centrist Governments (IDEOLB): Centrist governments are defined here as governments which are in the center of the political spectrum and governments which adhere to liberal values. The term "liberal" is applied to parties adhering to values that include freedom, democracy, and social justice. Common sub-labels are conservative liberal or libertarian for the more classical or traditional liberal governments and social-liberal for the more progressive liberal governments. Also included in the centrist category are populist governments that adopt a broad array of policies without regard to ideological consistency in order to appeal to the great masses of the population.
Left-of-Center Governments (IDEOLC): Left-of-center governments adhere to strong social-democratic progressive, and socialist philosophies. Social democratic parties are defined as more moderate socialist parties, often having strong pro-labor tendencies. Socialist parties adhere to a straight socialist philosophy. Progressive parties refer to left wing parties that promote special interests such as agrarian governments that represent the interests of farmers and peasants and green governments, which represent various kinds of ecological interests.
Extremist Governments (Omitted Classification): Extremist governments can either be far right-wing, far left-wing, or authoritarian in nature. Far right-wing is a collection label for extreme nationalist, religious fundamentalist, fascist, and xenophobic or tribalistic governments. Also, military governments are included in this category. Extreme Nationalist governments are defined here as governments strongly emphasizing national values. Religious fundamentalist governments inscribe extreme religious values into law that govern every aspect of life. Fascist parties include those adhering to Mussolini'ist ideology. Xenophobic parties are those that are hostile to national minorities. Far left-wing governments includes extreme left wing and communist governments. Extreme left-wing is used for autocratic socialist parties. State control over the economic, legal and political system is seen. Communist is reserved for governments officially adhering to a Marxist ideology.

Some political labels may overlap. For example, authoritarian parties are defined as parties ruling with or striving after a dictatorial way of governing. Most often, both communist and Fascist parties are also authoritarian. One-issue parties focus only on one issue like feminism, pensioners, or the environment. Depending on whether the one issue is considered highly important on the left or the right side of the political spectrum determines the party's ideology with-in the context of this study. Other kinds of parties have also been considered and integrated into other categories based on their orientation across the political spectrum from left to right. Some examples are as follows: pseudo parties are parties legally existing in dictatorships and are subject to the leadership of the dictator. An example is Panama under General Noriega. Regionalist parties look after the interest of a specific region. Separatist and independent parties strive for independence from a larger body they are incorporated into.

This sample has several advantages. The ability to capture uncertainty in a manner that can be theoretically and empirically tested has always been a challenge in modern economics. Uncertainty stemming from the political process is sometimes viewed in the same manner that Justice Potter Stewart defined obscenity: we know it when we see it.[26] Unfortunately, in economics today, this isn't good enough. Without clearly defined political uncertainty measures, theory can't be tested. This study's main contribution is its attempt to develop robust measures of political uncertainty that can be tested in an empirical manner. These empirical results can be the foundation for the development of future theory on the subject. No other study has captured the time element of either of the political variables, NEWGOV and IDEOL, over a broad cross-section of countries and for a lengthy period of time. Due to the lack of easily accessible

[26] This relation was first used by Haber, Razo, and Maurer (1999).

ordinal data on the presence of new governments and on government ideology, other studies that measure the political process tend to have a one-country focus. This greatly simplifies the data collection ordeal. This study is based on an extensive data collection process which measures the uncertainty generated from the political economy of a large cross section of developing countries. Its importance is significant for developing countries that are trying to better understand their path to growth and development. Serven and Solimano (1993) stress the importance of the need for further research in the relationship between political regimes and capital accumulation. Also, the classification system developed here opens the door to numerous research possibilities. The large nature of the data set gives it the flexibility to be broken down into sub-sections. Besides making overall observations about the effect the political process has in developing countries, research can also be pursued according to regions: Asia, Africa, and Latin America and the Caribbean. This allows cross regional comparisons to be made. Additionally, the length of the time series data, from 1960 to 1992 allows for different time periods to be compared.

While these data have advantages, they also have several short comings. First, by measuring NEWGOV on an annual basis, I cannot tell whether a year that experienced a change in government saw the change occur in the beginning, middle, or end of the year. NEWGOV measured on a quarterly basis would correct for this. This consideration would involve an extensive amount of data collection, both for the political and the economic variables, and is a topic for future study. For example, the source of most economic variables, the Penn World Tables, only reports on an annual basis. By going to another source to find quarterly macroeconomic data, I would lose the high quality of

comparability of data across countries that the Penn Tables provides. In regard to IDEOL, although every measure has been taken to ensure the accuracy of the classification system developed in the study, there is still an element of subjective opinion within the rating system. Despite these limitations, the political variables are robust measures that offer important insights into the working of the political economy.

5.3 GROUPWISE MEANS ANALYSIS BY REGION

In addition to general descriptive statistics, group specific statistics show noteworthy trends. The extent that the political process influences the macro-economy depends on how active the political process is. Overall, according to the data in this study, the average length for a government to stay in power is 5.4 years. When this overall mean is more closely scrutinized according to region, it becomes clear that governments are relatively long-lived in Africa, live relatively average lives in Asia, and are relatively short-lived in Latin America and the Caribbean. Table 5.4 summarizes these results.

Table 5.4: Means Tests for Average Years in Power for a Government by Region. t-Test: Two-Sample Means Test Assuming Unequal Variance.

	Regional Mean	Overall Mean	Sample size by region	Overall sample size
Africa	9.21 yrs *** (-2.60)	5.4 years	426	1386
Asia	6.60 yrs (-1.18)	5.4 years	394	1386
Latin America & Caribbean	3.54 yrs ** (2.38)	5.4 years	650	1386

Notes: 1. t-statistics in parenthesis. 2. * Significant at the0.10 level, ** Significant at the 0.05 level, *** Significant at the 0.01 level, all two-tailed tests.

Given that different regions of the world have various degrees of political stability, an interesting question is whether the macro-economy reacts differently to changes in government across regions. Does Latin America and the Caribbean have too much political change? Does Africa have too little political change? These questions will be addressed in the following chapter.

Differences in political ideologies across regions are given in Table 5.5. To summarize the ideology variables, about 40% of the data reflect the omitted classification of extremist governments. Right-of-Center governments are the next most prevalent, followed by left-of-center and finally centrist governments. This is interesting information to expand upon for regional comparisons. How long is the ideal time for a government to stay in power? Also, which political philosophies have been the most successful for stimulating growth in which regions over the long-run?

Table 5.5: Means Tests for Ideology by Region.
t-Test: Two-Sample Means Test Assuming Unequal Variance.

	IdeolA	IdeolB	IdeolC	Sample Size
Total	.251	.16	.188	1386
Africa	.343 (-.620)	.05** (2.19)	.273 (.770)	426
Asia	.096** (2.005)	.09 (1.37)	.201 (-.113)	394
Latin America & Caribbean	.282 (-.419)	.274* (-1.648)	.128 (.934)	650

Notes: 1. t-statistics in parenthesis. 2. * Significant at the 0.10 level, ** Significant at the 0.05 level, *** Significant at the 0.01 level, all two-tailed tests.

5.4 METHODOLOGY AND MODEL SPECIFICATIONS

In order to properly test the hypothesis that policy uncertainty created by the political process, proxied by changes in heads of state and competing political ideologies, have a negative effect on the macro economy, both the standard economic variables and the political variables of interest need to be accounted for within the same regression equation. Unfortunately, empirical growth models are not guided by a standard theoretical consensus that dictates which variables should be held constant in order to conduct statistical tests between the dependent variable and the primary independent variables of interest. As a result, a wide range of studies use various control variables. This yields a vast array of empirical literature.

Correctly specifying regression equations presents many challenges. Perhaps one of the most common problems is the omission of relevant variables and the inclusion of irrelevant variables. In an attempt to best deal with this situation, all three of the regression equations developed in this paper follow a particular equation format. This format categorizes the independent variables into three groups: variables always used in the regression, variables of particular interest, and variables chosen from a pool of variables identified as potentially important. This last category essentially captures variables that have been identified by other studies as being important, but their significance is still highly debated. As is typical with standard cross-country growth regressions, the independent variables are linear. The regression format used in this study is as follows.

Regression Format:

$$\mathbf{Y = \beta_0 + \beta_i I + \beta_m M + \beta_z Z + u}$$

Y = Dependent variable
I = Set of variables always used in the regression
M = Variables of interest
Z = Subset of variables chosen from a pool of variables identified as potentially important explanatory variables.

The area of interest is the relationship between M (the variables of interest) and Y (the dependent variable). But in order to give supporting evidence to this relationship, other specifications need to be correct. The main explanatory variables always used in the regression need to be identified. Although once this is done, the continual evolving debate on the correctness of all relevant control variables still goes on. These points of debate can easily be incorporated into the model by including them in the group of Z variables (potentially important variables). The importance of allowing for additional potentially important variables is to see if they have the effect of changing the relationship between the variables of interest and the dependent variable. If they do not, it adds support to the relationship between the variables of interest and the dependent variable. If the presence of certain potentially important variables do have the impact of changing the sign or the significance of the variables of interest, then these variables can only be thought of as "fragile" as opposed to strongly "robust".

5.4.1 TESTS ON GROWTH IN PER CAPITA GDP

The first of three equations developed in this thesis to test the hypothesis that policy uncertainty generated by the political process has a negative effect on the macro economy is addressed here. The first equation looks at growth in the economy, with

change in per capita GDP as the dependent variable. Policy uncertainty generated by the political process is measured by looking at the effects of new governments in power and government ideologies. To control for the effects of factors other than the presence of new governments (NEWGOVA and NEWGOVB) and government ideology (IDEOLA, IDEOLB, and IDEOLC), a reduced form regression is estimated.

Equation 1: Change in per capita GDP

$$\mathbf{Y} = \beta_0 + \beta_i \mathbf{I} + \beta_m \mathbf{M} + \beta_z \mathbf{Z} + \mathbf{u}$$

$\mathbf{Y}$ = $CGGDP_{i,t}$
$\mathbf{I}$ = $CGINV_{i,t}$, $INCOME_{i,t}$, $SECED_{i,t}$, $CGPOP_{i,t}$
$\mathbf{M}$ = NEWGOVA, NEWGOVB, IDEOLA, IDEOLB, IDEOLC
$\mathbf{Z}$ = $GOVTIME_{i,t}$, $CGOPEN_{i,t}$

In this equation, β_i I, β_m M, and β_z Z can be replaced by the variables they represent.

This is the long form of the equation:

$$CGGDP_{i,t} = a_0 + a_1 CGINV_{i,t} + a_2 INCOME_{i,t} + a_3 SECED_{i,t} + a_4 CGPOP_{i,t}$$
$$+ a_5 NEWGOVA + a_6 NEWGOVB + a_7 IDEOLA + a_8 IDEOLB + a_9 IDEOLC$$
$$+ a_{10} GOVTIME + a_{11} CGOPEN_{i,t} + \varepsilon_{i,t}$$

where

$CGGDP_{i,t}$ is the percentage change in real per capita GDP. $CGINV_{i,t}$ is the change in real investment share of GDP. $INCOME_{i,t}$, $SECED_{i,t}$, and $CGPOP_{i,t}$ stand for the initial 1960 real income, the initial 1960 enrollment in secondary education, and the change in population respectively. NEWGOVA and NEWGOVB are dummy variables for the presence of new governments in power. More specifically, NEWGOVA = 1 for the presence of one new government in a country during the calendar year, 0 otherwise. NEWGOVB = 1 for two or more new governments in a country during the calendar year,

0 otherwise. This leaves the omitted classification being no new governments, or no change in the head of state for a country in the calendar year. IDEOL is a dummy variable that captures the ideology of the political party in power. More specifically, IDEOLA = 1 for a right-of-center government, 0 otherwise. IDEOLB = 1 for a centrist government, 0 otherwise. IDEOLC = 1 for a left-of-center government, 0 otherwise. This leaves the omitted classification an extremist government, either left wing communist, right wing military, or extreme nationalist or tribal in nature.[27]

The main economic variables (CHINV, INCOME, SECED, and CGPOP) attempt to capture the correct economic specifications for cross-country growth regressions. If the equation is underspecified, the political variables of interest will loose credibility, despite the fact they may be statistically significant. Together, the variables CGINV, INCOME, SECED, and CGPOP account for the most commonly used control variables in empirical growth equations. A survey of 41 growth studies conducted by Levine & Renelt (1991) found 33 studies included investment share as an explanatory variable, while 29 studies included population growth, 18 studies included initial income levels, and 13 studies included a human-capital measure as an explanatory variable.

Despite the completeness of these independent variables, they each have their own conceptual concerns. The variable CGINV, measured as the ratio of investment to GDP, is considered a major explanatory variable of growth. But the causal relationship between growth and investment is ambiguous. Other variables in the growth regression may influence investment. To address this point, equation 2 in section 5.4.2 investigates the partial correlation between growth and investment and the relevant macro-economic and political variables. The variable INCOME, measuring the initial 1960 real income, is

[27] A more detailed description of the Ideological Classification system is given in Section 5 of this paper.

used in the growth equation to address the convergence theory that poor countries will grow faster than rich countries, other things equal. A negative correlation between INCOME and CGGDP is expected. The variable SECED, the ratio of secondary school enrollment per 100 age relevant citizens, is a measure of human capital. Although investment in human capital includes more than just formal education.[28] Finally CHPOP, which represents population growth, can have measurement errors due to poor census data from countries that lack a strong infrastructure.

The predicted per capita GDP effects in equation (1) rest on the standard rational expectations approach to political economy. From a per capita GDP perspective, NEWGOVA is expected to reduce growth in per capita GDP, since the uncertainty surrounding policy change creates a wait-and-see attitude in the economy. NEWGOVB is also expected to reduce growth in per capita GDP, but to a greater extent than NEWGOVA. The reason is that two or more changes in the head of state in a calendar year signifies a larger amount of uncertainty. Consequently, the direction of future policy becomes even more unknown and the reduction in growth in per capita GDP is even greater.

As for ideology measures, IDEOLA, or right-of-center governments, is expected to create the least amount of uncertainty due to a conservative government's philosophy of less government involvement and more market forces in the economy. This should send positive signals to capital owners as to the government's commitment to creating policies that will maximize profits. IDEOLB, or centrist governments, are expected to become more involved in the economy due to their greater concern for social

[28] Other commonly used human-capital measures include primary school enrollment and literacy measures. The disadvantage to these measures is that some countries have come close to reaching an upper boundary, thus making these measure less suitable for analysis.

responsibility. This signals more government involvement in the economy and therefore creates more policy uncertainty. IDEOLC, or left-of-center governments, with a socialist philosophy are expected to concern themselves more directly with the well-being of workers by producing policies that focus more on worker wage maximization and social redistribution issues instead of profit maximization. This would result in a larger negative impact on the direction of future policy. Finally, the omitted classification, extremist governments, are expected to be the least desirable in nature. This is attributed to the often undemocratic nature of these governments. Also, commitments to other philosophical goals besides profit maximization are often seen. Therefore, this classification is expected to create the greatest amount of uncertainty and to have the greatest negative impact on per capita GDP. Since the omitted classification is expected to have the worst impact on per capita GDP, the other IDEOL dummy variables (IDEOLA, IDEOLB, and IDEOLC) should all have positive effects when compared to extremist governments.

Finally the **Z** variables, representing the potentially important explanatory variables, include GOVTIME and CGOPEN. GOVTIME is expected to have a negative effect on growth. Inclusion of GOVTIME is important because it controls for the effect that the longer a government stays in power, the greater is the probability that the government will change. The greater the probability of a government change, the greater the potential for a change in government to actually occur, thereby creating a negative effect on per capita GDP. CGOPEN explores empirical trade literature that examines the relationship between trade and growth. CGOPEN is expected to have a positive effect on

per capita GDP, the idea being that economies more active in trade will have higher levels of GDP. CGOPEN also acts as the dependent variable in equation 3.

The expected results of equation (1) are summarized in Table 5.6.

TABLE 5.6:
SUMMARY OF EXPECTED RESULTS:
GROWTH IN PER CAPITA GDP EQUATIONS ($CGGDP_{i,t}$)

Independent Variable	Definition	Predicted Effect
I Variables, Standard Economic Variables:		
CGINV	Change in real Investment share of GDP [%] (1985 IP)	Positive
CGPOP	Change in Population growth	Negative
INCOME	Initial 1960 real income	Negative
SECED	Initial 1960 enrollment in secondary education	Positive
Z Variables, Subset of Potentially Important Variables:		
CGOPEN	Change in OPEN (exports + imports)	Positive
GOVTIME	Control variable: measuring how long a government has been in power	Positive
M Variables, Variables of Particular Interest in This Study:		
NEWGOVA	Dummy Variable: 1 = one change in government in a calendar year, 0 = otherwise	Negative
NEWGOVB	Dummy Variable: 1 = two or more changes in government in a calendar year, 0 = otherwise	Negative (NEWGOVB is predicted to have a larger negative effect than NEWGOVA)
IDEOLA	Dummy Variable: 1 = Right-of-Center Govt., 0 = otherwise	Positive (IDEOLA >IDEOLB)
IDEOLB	Dummy Variable: 1 = Centrist Govt., 0 = otherwise	Positive (IDEOLB >IDEOLC)
IDEOLC	Dummy Variable: 1 = Left-of-Center Govt., 0 = otherwise	Positive

5.4.2 TESTS ON INVESTMENT AS A PERCENTAGE OF GDP

The second of three equations developed in this thesis focuses on how policy uncertainty generated by the political process affects investment. The investment equation is as follows.

Equation 2: Change in Investment as a percentage of GDP

$$\mathbf{Y} = \beta_0 + \beta_i \mathbf{I} + \beta_m \mathbf{M} + \beta_z \mathbf{Z} + \mathbf{u}$$

$\mathbf{Y}$ = $CGINV_{i,t}$
$\mathbf{I}$ = $CGGDP_{i,t}$, $CGOPEN_{i,t}$, $INCOME_{i,t}$, $PRICE_{i,t}$, $CGPOP_{i,t}$
$\mathbf{M}$ = NEWGOVA, NEWGOVB, IDEOLA, IDEOLB, IDEOLC
$\mathbf{Z}$ = $GOVTIME_{i,t}$, $CGCON_{i,t}$

The long form equation is:

$$CGINV_{i,t} = a_0 + a_1 CGGDP_{i,t} + a_2 CGOPEN_{i,t} + a_3 INCOME_{i,t} + a_4 PRICE_{i,t} + a_5 CGPOP_{i,t} + a_6 NEWGOVA + a_7 NEWGOVB + a_8 IDEOLA + a_9 IDEOLB + a_{10} IDEOLC + a_{11} GOVTIME + CGCON_{i,t} + \varepsilon_{i,t}$$

where

CGINV denotes the change in investment as a percentage of GDP. Other variables are defined as in equation (1). While PRICE is an inflation index and CGCON is the change in consumption as a percentage of GDP.

The above regression is expected to have the same reaction to the presence of new governments and to the various ideologies of political parties in power as growth in per capita GDP. This theory is supported by Rodrik (1991) who links policy uncertainty to levels of aggregate private investment and shows how even moderate amounts of policy uncertainty can act as a tax on investment. Equation 2 is an important complement to Equation 1. The political variables of interest are expected to have the same negative

impact on investment as they do on growth in per capita GDP. For example, if the presence of a new government has a negative impact on growth in per capita GDP but a positive impact on investment, a new set of questions would be needed concerning what factors played a role in preventing growth despite a surge in investment. In the opposite scenario, if the presence of a new government stimulated growth but not investment, by what vehicle was growth driven? Rodrik's model outlined in Chapter 4 explicitly demonstrated how policy uncertainty acts as a tax on investment. Any tax on investment should also be considered a tax on growth. Therefore, the political variables of interest, namely NEWGOVA, NEWGOVB, IDEOLA, IDEOLB, and IDEOLC should have similar effects on both equations 1 and 2. The investment equation is also important because of the potential effect the control variables have on both per capita GDP and investment. By including the dependent variable as an independent variable in a separate equation, hopefully the individual effects these variables have on each other can be identified.

Not explicitly shown in equation (2) is the influence of interest rates. I recognize the importance interest rates have when it comes to investment levels. Investment and interest rates would be expected to have a negative relationship since higher real interest rates make the cost of borrowing money for investment more expensive.

The expected results of equation (2) are summarized in Table 5.7.

TABLE 5.7:
SUMMARY OF EXPECTED RESULTS:
INVESTMENT EQUATIONS ($CGINV_{i,t}$)

Independent Variable	Definition	Predicted Effect
I Variables, Standard Economic Variables:		
CGGDP	Change in real GDP per capita (1985 IP)	Positive
CGOPEN	Change in OPEN (exports + imports)	Positive
CGPOP	Change in Population	Negative
INCOME	Initial 1960 real income	Negative
PRICE	Price level index	Negative
Z Variables, Subset of Potentially Important Variables:		
GOVTIME	Control variable: measuring how long a government has been in power	Negative
CGCON	Change in real consumption as a % of GDP	Negative
M Variables, Variables of Particular Interest in This Study:		
NEWGOVA	Dummy Variable: 1 = one change in government in a calendar year, 0 = otherwise	Negative
NEWGOVB	Dummy Variable: 1 = two or more changes in government in a calendar year, 0 = otherwise	Negative (NEWGOVB is predicted to have a larger negative effect than NEWGOVA)
IDEOLA	Dummy Variable: 1 = Right-of-Center Govt., 0 = otherwise	Positive (IDEOLA >IDEOLB)
IDEOLB	Dummy Variable: 1 = Centrist Govt., 0 = otherwise	Positive (IDEOLB >IDEOLC)
IDEOLC	Dummy Variable: 1 = Left-of-Center Govt., 0 = otherwise	Positive

5.4.3 TESTS ON OPENNESS.

International trade has been a "hot topic" of debate going as far back in history as economic thought itself. In the 1700's, Adam Smith believed international trade would allow countries to specialize in a way that would be unprofitable if economies remained closed. The trade pendulum has swung back and forth over time. In the 20th Century alone, public opinion has changed many times. International trade played a popular role in the American economy at the opening of the 1900's, only to break down with the advent of each world war and anti-trade legislation. The second half of the century saw the American economy embrace trade, which helped contribute to its unprecedented post-war growth.[29] At the same time, developing countries flip-flopped from a closed import-substitution policy to opening up and actively participating in the global economy towards the end of the century. Today, an extensive amount of empirical and theoretical attention has been devoted to the subject of international trade. Trade indicators such as exports, imports, and total trade have been thoroughly examined.

With respect to the traded sector (CGOPEN) the presence of new governments is expected to have negative effects. Theoretically speaking, according to Cohen and Maloney (1991), future policy uncertainty can cause exporting firms to hesitate before doing business in a country. This is largely because international finance always accompanies international trade. Overseas firms exporting into countries with large amounts of uncertainty may be nervous over whether future policy will include anti-trade biases. For example, future capital controls in the domestic economy could limit the amount of money that flows out of the country for the purpose of export payments.

[29] Due to the large size of the American economy, American exports and imports were large in absolute terms, but were still relatively small when compared to the overall size of the U.S economy.

Improper exchange rates could hurt the countries balance of payments and its stock of foreign currency reserves. Additional taxes and tariffs could decrease the demand for overseas products. Domestic firms that export overseas may worry that if imports into the country break down, they may no longer be able to get their necessary imported factors of production and may instead have to substitute with more expensive domestic parts.

The last of three equations developed in this thesis are as follows:

Equation 3: Change in Openness (Exports + Imports)

$$\mathbf{Y} = \beta_0 + \beta_i \mathbf{I} + \beta_m \mathbf{M} + \beta_z \mathbf{Z} + \mathbf{u}$$

$\mathbf{Y}$ = $CGOPEN_{i,t}$
$\mathbf{Z}$ = $CGGDP_{i,t}$, $CGINV_{i,t}$, $INCOME_{i,t}$, $PRICE_{i,t}$, $EXC_{i,t}$
$\mathbf{M}$ = NEWGOVA, NEWGOVB, IDEOLA, IDEOLB, IDEOLC
$\mathbf{Z}$ = $GOVTIME_{i,t}$

The long form equation is:

$$CGOPEN_{i,t} = a_0 + a_1 CGGDP + a_2 CGINV_{i,t} + a_3 INCOME_{i,t} + a_4 SEC_{i,t} + a_5 CHPOP_{i,t}$$
$$+ a_6 NEWGOVA + a_7 NEWGOVB + a_8 IDEOLA + a_9 IDEOLB + a_{10} IDEOLC$$
$$+ a_{11} GOVTIME + \varepsilon_{i,t}$$

The predicted effects of new governments and government ideology on openness are presented in Table 5.8. Again, the political variables are expected to have the same effect on CGOPEN as they did on CGGDP and CGINV.

TABLE 5.5:
SUMMARY OF EXPECTED RESULTS:
OPENNESS EQUATION ($CGOPEN_{i,t}$)

Independent Variable	Definition	Predicted Effect
I Variables, Standard Economic Variables:		
CGGDP	Change in real GDP per capita (1985 IP)	Positive
CGINV	Change in real Investment share of GDP [%] (1985 IP)	Positive
INCOME	Initial 1960 real income	Negative
PRICE	Price level index	Negative
EXC	Exchange rate per US $	Negative
Z Variables, Subset of Potentially Important Variables:		
GOVTIME	Control variable: measuring how long a government has been in power	Negative
M Variables, Variables of Particular Interest in This Study:		
NEWGOVA	Dummy Variable: 1 = one change in government in a calendar year, 0 = otherwise	Negative
NEWGOVB	Dummy Variable: 1 = two or more changes in government in a calendar year, 0 = otherwise	Negative (NEWGOVB is predicted to have a stronger negative effect than NEWGOVA)
IDEOLA	Dummy Variable: 1 = Right-of-Center Govt., 0 = otherwise	Positive (IDEOLA >IDEOLB)
IDEOLB	Dummy Variable: 1 = Centrist Govt., 0 = otherwise	Positive (IDEOLB >IDEOLC)
IDEOLC	Dummy Variable: 1 = Left-of-Center Govt., 0 = otherwise	Positive

5.5 CONCLUSION

Overall, the equations developed and presented in this chapter shed light on the hypothesis that policy uncertainty created by the political process has a negative effect on the macro economy. The challenge has been essentially three-fold. First, the relevant political data needed have been collected and amassed into a large cross-sectional dataset suitable for econometric analysis. Second, the relevant economic variables needed have been identified and collected in order to correctly specify the dependent variables. Third, reduced form regression equations have been developed to test the effect new governments and government ideology has on growth in per capita GDP, growth in investment as a percentage of GDP, and growth in the traded sector. The next chapter (Chapter 6) presents the econometric approach and the econometric results to the equations developed in this chapter.

CHAPTER 6

REGRESSION RESULTS ON GDP, INVESTMENT, AND TRADE

6.1 INTRODUCTION AND ECONOMETRIC APPROACH

In this section the empirical evidence on the effects of new governments and government ideology on the macro-economy is presented. For this purpose, Section 6.1 focuses on the econometric approach used in this research, while Sections 6.2, 6.3, and 6.4 are devoted to presenting regression results on per capita GDP, investment, and openness. Section 6.5 examines regional comparisons of investment. Section 6.6 addresses specific econometric issues. Finally, section 6.7 concludes the discussion.

As explained in the previous chapter, three regression equations have been developed to test the effects of new governments in power and government ideology on the macro-economy. The three dependent variables are growth in per capita GDP (CGGDP), change in investment as a percentage of GDP (CGINV), and change in openness relative to nominal GDP (CGOPEN). For each regression equation, three different modeling techniques are used in order to address various econometric issues. The first modeling technique is Ordinary Least Squares. In this case, the regression equation is in the format:

$$Y_{i,t} = \alpha + \beta x_{i,t} + \varepsilon_{i,t} ,$$

where $i = 1.....N$, N is the number of cross section groups.

$t = 1.....T$, T is the number of time periods.

OLS is a starting point for the analysis because of the fundamental assumption its estimators are the best linear unbiased estimators (BLUE). The second econometric technique allows for robust estimation of the OLS covariance matrix. The presence of heteroskedasticity and autocorrelation is considered in the data. OLS assumes the variance of the error term is constant for all values of the independent variables. When this assumption is relaxed, the issue of heteroscedasticity arises. Heteroscedasticity leads to standard errors that are still unbiased but are no longer efficient. In other words, minimum variances are not present. Therefore, we allow for groupwise heteroscedasticity: $E(\varepsilon_{i,t}^2) = \sigma_{ii}$

Autocorrelation is present when the error term is period t is positively correlated with the error term in period t-1. This is common in time-series data and causes the standard errors to be biased downwards. Although, because much of the data has been first differenced, autocorrelation shouldn't be as large of a factor as would normally be expected with time series data. By allowing for autocorrelation, we have

$$\varepsilon_{i,t} = \rho_{i,} \varepsilon_{i,t-1} + u_{i,t}$$

Together, econometric testing using OLS and robust OLS techniques are foundations in which to compare other econometric techniques.

The third econometric technique addresses the fact that the three equations are a simultaneous-equations model. The dependent variable in each equation is also an independent variable in the other two equations. Therefore, simultaneous-equation bias exists making the estimators neither consistent nor efficient. Specifically, this bias is the underestimation or overestimation of the parameters as a result of the endogenous variables, which are also explanatory variables, being correlated with the error terms.

This violates an OLS assumption that the explanatory variables take on fixed values that are obtained in repeated samples, so that the explanatory variables and the error term are uncorrelated. As such, $E(X_i, u_i) = 0$. Three-stage-least squares (3SLS) regressses the endogenous variables on all of the exogenous variables and then uses the predicted values of each of the endogenous variables to estimate the reduced form structural equations in the model. As a result, estimators are efficient and unbiased.

6.2 REGRESSION RESULTS ON GROWTH IN PER CAPITA GDP

For review purposes, the short form of Equation 1 is as follows.

Equation 1: Growth in per capita GDP

$$\mathbf{Y} = \beta_0 + \beta_i \mathbf{I} + \beta_m \mathbf{M} + \beta_z \mathbf{Z} + \mathbf{u}$$

$\mathbf{Y}$ = $CGGDP_{i,t}$
$\mathbf{I}$ = $CGINV_{i,t}$, $INCOME_{i,t}$, $SECED_{i,t}$, $CGPOP_{i,t}$
$\mathbf{M}$ = NEWGOVA, NEWGOVB, IDEOLA, IDEOLB, IDEOLC
$\mathbf{Z}$ = $GOVTIME_{i,t}$, $CGOPEN_{i,t}$

Estimates of the effect policy uncertainty has on the growth in per capita GDP are presented in Table 6.1. The appropriate t-statistic for each variable is given in each case. Table 6.1 shows that some, but not all, of the political variables of interest have the expected effect on CGGDP, while the standard economic variables and potentially important variables also have mixed results. First, closely analyzing the standard economic variables, most of the variables have the expected effect on the dependent variable, growth in per capita GDP. When looking at both the standard OLS results and the robust OLS results controlling for groupwise heteroskedasticity and within group autocorrelation, change in investment as a percentage of GDP has a positive and

significant effect on growth in per capita GDP in both cases. This is consistently documented in economic literature. It gives additional support to the widely held belief that developing countries must encourage both domestic and international investment for their economies to grow. Especially since the emergence of the third world debt crisis, when a large part of the developing world was unable to meet debt repayment schedules, thereby closing the door for any new additional private sector loans, private investment became a critical tool for development. The population growth rate (CGPOP) has a negative and significant effect on growth in per capita GDP in both of the first two OLS regressions. This is expected. A fast growing population causes additional infrastructure strains on the macro-economy of a country. Expanding health services, education, food, and housing at the same rate as the population growth rate can be difficult for any country. The initial 1960 level of income, INCOME, also has a negative and significant effect on the dependent variable in both OLS regressions. This is consistent with the convergence theory; that poorer countries will offer greater returns and therefore grow faster than wealthier countries. Finally, the initial 1960 level of secondary school enrollment, SECED, has a positive and significant effect on growth in per capital GDP when using standard OLS and robust OLS. This supports the theory that countries will see positive returns from human capital investments.

When looking at the effect of using Three Stage Least Squares model technique (3SLS) on the standard economic variables, we see that only some of the variables are statistically significant. The variables representing population growth (CGPOP), initial 1960 real income (INCOME), and the initial 1960 enrollment in secondary school (SECED) all remain statistically significant. Change in investment as a percentage of

GDP (CGINV) is still positive but no longer statistically significant. In economic literature, change in investment as a percentage of GDP is a main explanatory variable of growth in per capita GDP. The failure to see significance with 3SLS may be attributed to instruments that do not perfectly represent the variable. This is always a challenge when using either Two or Three Stage Least Squares.

The potentially important variables, CGOPEN and GOVTIME, which stand for growth in the traded sector and the length of a government in power respectively, have mixed results. Growth in the traded sector is negative and significant when testing with OLS and robust OLS controlling for heteroskedasticity and autocorrelation, but is not significant when 3SLS is used. GOVTIME is not significant at any time.

More relevant to the political economy and to the objectives of this paper are the political variables. When testing using OLS and robust OLS estimates, NEWGOVA, or one change in government in a calendar year, has a negative and significant effect on the economy. NEWGOVB, or two or more changes in government in a calendar year, also has a statistically significant negative effect on the economy. As predicted, NEWGOVB has a larger negative impact on per capita GDP than NEWGOVA. This means that two or more new governments in one year create more policy uncertainty than one new government in a year. When testing using 3SLS estimates, all results surrounding two or more changes in government in a calendar year (NEWGOVB) are statistically significant. While results for one change in government in a calendar year, NEWGOVA, are no longer statistically significant. This is an important result. Once endogeneity is controlled for, moderate amounts of policy uncertainty created by one change in government in a calendar year does not have a significant effect on the economy. Only

larger amounts of uncertainty created by two or more changes in government in a calendar year have a negative effect on per capita GDP.

Unfortunately, no significant results are found when examining what role government ideology has on growth in per capita GDP. IDEOLA, IDEOLB, and IDEOLC all show results that are not significantly different from zero. Remember, the omitted category is extremist governments. This means no broad sweeping generalizations can be made about the effect government ideology has on GDP. These results are summarized below.

Table 6.1
SUMMARY OF THE EFFECTS OF POLICY UNCERTAINTY ON GROWTH IN PER CAPITA GDP ($CGGDP_{i,t}$):

Model: Comparing OLS to 3 Stage Least Squares, dependent variable: Growth in Per Capita GDP:

Regressor	Regressor Definition	OLS	Robust OLS, controlling for • *groupwise hetroskedasticity* • *within group autocorrelation*	3 Stage Least Squares, controlling for • *endogeneity*
I Variables: Standard Economic Variables				
C	Constant	.033*** (3.18)	.039*** (4.329)	.163 (.409)
CGINV	Real investment growth rate	.045*** (5.95)	.033*** (4.416)	.0748 (.470)
CGPOP	Population growth rate	-.88*** (-5.88)	-.940*** (-6.034)	-.878** (-2.559)
INCOME	Initial 1960 real income	-.7 E-05*** (-4.180)	-.7 E-05*** (-3.733)	-.667 E-05** (-1.988)
SECED	Initial 1960 enrollment in secondary school	.0006*** (3.312)	.00066*** (2.923)	.00061** (2.122)
Z Variables: Subset of Potentially Important Variables				
CGOPEN	Growth in the traded sector	-.025** (-2.367)	-.031** (-3.089)	-.130 (-.147)
GOVTIME	Control variable: measuring length of govt.	.00017 (.555)	.00007 (.206)	-.000362 (.391)
M Variables: Variables of Particular Interest in This Study				
NEWGOVA	Dummy Variable: 1 = one change in govt. in a calendar year, 0 = other.	-.0074 (-1.532)	-.0078* (-1.668)	-.00616 (-.600)
NEWGOVB	Dummy Variable: 1 = two or more changes in govt. in a calendar year, 0 = other.	-.0338*** (-3.318)	-.043*** (-4.214)	-.0283** (-1.964)
IDEOLA	Dummy Variable: 1 = Right-of-Center Govt., 0 = other.	.0020 (.507)	-.00022 (-.049)	-.00074 (-.036)
IDEOLB	Dummy Variable: 1 = Centrist Govt., 0 = other.	.0027 (.529)	-.00025 (-.043)	.00195 (.308)
IDEOLC	Dummy Variable: 1 = Left-of- Center Govt., 0 = other.	.0021 (.468)	-.00018 (-.034)	.00110 (.101)
Log-Likelihood Function		1903.43	1871.69	1791.32
Adjusted r-squared		.132	.116	.03645
F statistic		5.64,	4.97	3.85
Number of Observations		1344	1344	1344

Notes: 1. t-statistics are in parentheses. 2. Time dummies have been included in all regressions.
3. * Significant at the 0.10 level, ** Significant at the 0.05 level, *** Significant at the 0.01 level, all two tailed tests.

TABLE 6.2:
SUMMARY OF EXPECTED VS. ACTUAL EFFECTS:
GROWTH IN PER CAPITA GDP EQUATIONS ($CGGDP_{i,t}$)

Independent Variable	Definition	Predicted Effect	Actual Effect: Robust OLS / 3SLS
I Variables, Standard Economic Variables:			
CGINV	Change in real Investment share of GDP [%] (1985 IP)	Positive	Positive/No effect
CGPOP	Change in Population growth	Negative	Negative/Negative
INCOME	Initial 1960 real income	Positive	Positive/Positive
SECED	Initial 1960 enrollment in secondary education	Negative	Negative/Negative
Z Variables, Subset of Potentially Important Variables:			
CGOPEN	Change in OPEN (exports + imports)	Positive	No effect/No effect
GOVTIME	Control variable: measuring how long the government has been in power	Negative	No effect/No effect
M Variables, Variables of Particular Interest in This Study:			
NEWGOVA	Dummy Variable: 1 = one change in government in a calendar year, 0 = otherwise	Negative	Negative/No effect
NEWGOVB	Dummy Variable: 1 = two or more changes in government in a calendar year, 0 = otherwise	Negative	Negative/Negative
IDEOLA	Dummy Variable: 1 = Right-of-Center Govt., 0 = otherwise	Positive	No effect/No effect
IDEOLB	Dummy Variable: 1 = Centrist Govt., 0 = otherwise	Positive	No effect/No effect
IDEOLC	Dummy Variable: 1 = Left-of-Center Govt., 0 = otherwise	Positive	No effect/No effect

Note: 1. No effect means an effect that is not significantly different from zero.

6.3 REGRESSION RESULTS ON INVESTMENT

For review purposes, the short form of Equation 2 is as follows.

Equation 2: Change in investment as a percentage of GDP

$$\mathbf{Y} = \beta_0 + \beta_i \mathbf{I} + \beta_m \mathbf{M} + \beta_z \mathbf{Z} + \mathbf{u}$$

$\mathbf{Y}$ = $CGINV_{i,t}$
$\mathbf{I}$ = $CGGDP_{i,t}$, $CGOPEN_{i,t}$, $INCOME_{i,t}$, $PRICE_{i,t}$, $CGPOP_{i,t}$
$\mathbf{M}$ = NEWGOVA, NEWGOVB, IDEOLA, IDEOLB, IDEOLC
$\mathbf{Z}$ = $GOVTIME_{i,t}$, $CGCON_{i,t}$

Estimates on the effect of uncertainty generated by the political process on the change in investment as a percentage of GDP (CGINV) are presented in Table 7.2. The appropriate t-statistic for each variable is given in parenthesis. The main economic variables show mixed results. When using OLS and robust OLS correcting for heterskedasticity and autocorrelation, growth in per capita GDP (CGGDP) and growth in the traded sector as a percentage of GDP (CGOPEN) both have positive and significant effects on growth in investment as a percentage of GDP (CGINV). When using 3SLS, growth in the traded sector (CGOPEN) is significant but growth in per capita GDP is not significant. This shows that trade plays a very important role in economies. Economies that are actively involved in international trade are inclined to have higher investment levels. One reason for this effect could be that economies that open themselves to the international community send a positive and bold signal to the rest of the world. This positive signal may have a significant effect on investment levels. Many developing countries have a trading sector that exists on the value added concept. In such a case, it is necessary to import the needed factors of production, add value to these factors, and then export them to the next place where the next step of the production process can be

performed. Clearly, this type of production is dependent on open trading regimes. The other standard economic variables are not statistically significant. Neither the population growth rate, the initial 1960 real income, or the inflation price index have significant impacts on investment level when using either OLS, robust OLS controlling for heteroskedasticity and autocorrelation, and 3SLS.

Examining the economic variables that are potentially important, change in consumption as a percentage of GDP is negative and significant with using both OLS and robust OLS. It is not significant when using 3SLS. GOVTIME, measuring the amount of time the government has been in power, is negative but not significant in any of the regressions.

The political variables show interesting results. NEWGOVA and NEWGOVB are both negative and significant with all three regression techniques. Also, NEWGOVB has a larger negative effect than NEWGOVA. This means that two or more new governments in one year create more uncertainty than one new government in one year. This is a significant finding. These findings are consistent with Rodrik's model outlined in Chapter 4 showing that political uncertainty has a negative effect on investment levels. Rodrik's model demonstrates how the decision to invest can be delayed until the direction of future policy becomes clearer. This "wait-in-see" attitude acts as a tax on investment levels.

Comparing the results of changes in government (NEWGOVA and NEWGOVB) on both dependent variables, per capita GDP and investment as a percentage of GDP, shows noteworthy results. Without looking at 3SLS, it seems that changes in government have a negative effect on both per capita GDP and on investment levels. Both

NEWGOVA and NEWGOVB, or one change in government in a calendar year and two or more changes in government in a calendar year respectively, have negative effects on per capita GDP and investment levels. When 3SLS regression technique is used controlling for endogeneity, both variables representing changes in government (NEWGOVA and NEWGOVB) now have a negative and significant effect on investment, but only partially have a negative effect on per capita GDP. When 3SLS is applied to per capita GDP, one change in government in a calendar year (NEWGOVA) does not have a significant effect. Only when two or more changes in government in a calendar year (NEWGOVB) occurs does uncertainty generated by the political process have a negative effect on per capita GDP. When one change in government occurs in a calendar year, investment levels are down, but the economy as a whole does not significantly suffer. Other factors in the economy, like human capital and increasing returns to scale are able to keep the economy robust. Only when larger levels of uncertainty are present as a result of the government changing two or more times in a calendar year does the economy start to significantly feel these negative effect as a result of an unstable political system. This implies that moderate levels of policy uncertainty directly affect investment levels, and then only indirectly affect per capita GDP. Investment is the most responsive and volatile variable when policy uncertainty occurs. Only larger levels of policy uncertainty directly affect both investment and per capita GDP.

The political variables representing various ideologies of government fail to have any significant findings. Neither right of center governments, centrists governments, or left of center governments have any effect on investment levels. Remember, the omitted

category is extremist governments, either left wing or right wing in nature. More research in this area by better defining political ideology would help bring more significant results. Overall, what can be ruled out with certainty is the theory that supports limited government being the desired engine to growth and investment. This has proven not to be the case. Limited government have had success in the industrialized world, but it is presumptuous to assume the same ideological structure works in the developing world. This supports evidence in favor of rejecting the hypothesis that limited governments have the best effect on the economy.

Table 6.3
SUMMARY OF THE EFFECTS OF POLICY UNCERTAINTY ON GROWTH IN INVESTMENT AS A PERCENTAGE OF GDP ($CGINV_{i,t}$):

Model: Comparing OLS to 3 Stage Least Squares: dependent var. is change in investment as a % of GDP

Regressor	Regressor Definition	OLS	Robust OLS, controlling for • *groupwise hetroskedasticity* • *within group autocorrelation*	3 Stage Least Squares, controlling for • *endogeneity*
I Variables: Standard Economic Variables				
C	Constant	4.75 (.768)	.120 (.897)	.053 (.319)
CGGDP	Per capita growth in GDP	.603*** (6.428)	.653*** (6.189)	.9213 (1.112)
CGOPEN	Growth in the traded sector	.128*** (3.626)	.126*** (3.207)	.160* (1.649)
CGPOP	Population growth rate	-.533 (-1.086)	-.734 (-1.360)	-.097 (-.102)
INCOME	Initial 1960 real income	-.324 E-05 (-.667)	-.304 E-05 (-.591)	.206 E-05 (.240)
PRICE	Price level index	.179 E-03 (1.237)	.169 (1.095)	.637 E-04 (.275)
Z Variables: Subset of Potentially Important Variables				
CGCON	Change in Consumption as a % of GDP	-.861 E-03* (-1.844)	-.700 (-1.58)	-.936 (-1.502)
GOVTIME	Control variable: measuring length of govt.	-.00143 (-1.40)	-.0015 (-1.346)	-.00039 (-.110)
M Variables: Variables of Particular Interest in This Study				
NEWGOVA	Dummy Variable: 1 = one change in govt. in a calendar year, 0 = other	-.0421*** (-2.629)	-.0394** (-2.154)	-.0429** (-1.991)
NEWGOVB	Dummy Variable: 1 = two or more changes in govt. in a calendar year, 0 = other.	-.0847** (-2.464)	-.0936** (-2.418)	-.0697** (-2.116)
IDEOLA	Dummy Variable: 1 = Right-of-Center Govt., 0 = other.	.0088 (.674)	.0110 (.784)	-.0143 (-.205)
IDEOLB	Dummy Variable: 1 = Centrist Govt., 0 = other	.0121 (.703)	.0114 (.616)	.00045 (.017)
IDEOLC	Dummy Variable: 1 = Left-of- Center Govt.	.586 (.039)	.00192 (118)	-.0125 (-.342)
Log-Likelihood Function		365.904	217.43	163.305
Adjusted r-squared		.245	.080	-.2230
F statistic		10.45	3.48	n/a
Number of Observations		1344	1344	1344

Note: 1. t-statistics are in parentheses. 2. Time dummies have been included in all regressions.
3. * Significant at the 0.10 level, ** Significant at the 0.05 level, *** Significant at the 0.01 level, all two-tailed tests.

TABLE 6.4
SUMMARY OF EXPECTED VS. ACTUAL EFFECTS:
INVESTMENT EQUATIONS ($CGINV_{i,t}$):

Independent Variable	Definition	Predicted Effect	Actual Effect Robust OLS/3SLS
I Variables, Standard Economic Variables:			
CGGDP	Change in real GDP per capita (1985 IP)	Positive	Positive/No effect
CGOPEN	Change in OPEN (exports + imports)	Positive	Positive/Positive
INCOME	Initial 1960 real income	Negative	No effect/No effect
PRICE	Inflation price index	Negative	No effect/No effect
CGPOP	Change in Population	Negative	No effect/No effect
Z Variables, Subset of Potentially Important Variables:			
CGCON	Change in real Consumption as a % of GDP	Negative	No effect/No effect
GOVTIME	Control variable: measuring how long a government has been in power	Negative	No effect/No effect
M Variables, Variables of Particular Interest in This Study:			
NEWGOVA	Dummy Variable: 1 = one change in government in a calendar year, 0 = otherwise	Negative	Negative/Negative
NEWGOVB	Dummy Variable: 1 = two or more changes in govt. in a calendar year, 0 = other.	Negative	Negative/Negative
IDEOLA	Dummy Variable: 1 = Right-of-Center Govt., 0 = other.	Positive	No effect/No effect
IDEOLB	Dummy Variable: 1 = Centrist Govt., 0 = otherwise	Positive	No effect/No effect
IDEOLC	Dummy Variable: 1 = Left-of-Center Govt., 0 = other.	Positive	No effect/No effect

Note: No effect means an effect that is not significantly different from zero.

6.4 REGRESSION RESULTS ON OPENNESS

Now turning to the traded sector. Equation (3), which has change in openness (CGOPEN) as the dependent variable, is as follows.

Equation 3: Change in Openness

$$\mathbf{Y} = \beta_0 + \beta_i \mathbf{I} + \beta_m \mathbf{M} + \beta_z \mathbf{Z} + \mathbf{u}$$

$\mathbf{Y}$ = $CGOPEN_{i,t}$
$\mathbf{Z}$ = $CGGDP_{i,t}$, $CGINV_{i,t}$, $INCOME_{i,t}$, $PRICE_{i,t}$, $EXC_{i,t}$
$\mathbf{M}$ = NEWGOVA, NEWGOVB, IDEOLA, IDEOLB, IDEOLC
$\mathbf{Z}$ = $GOVTIME_{i,t}$

Estimates on the effect of political uncertainty on the degree of openness (exports + imports) in an economy are presented in Table 7.3. The t-statistics are given in parenthesis. The results are unexpected. When looking at regression results using OLS and robust OLS controlling for autocorrelation and heteroskedasticity, CGGDP and CGINV have a very noticeable effect. When change in investment as a percentage of GDP (CGINV) increases, so does the change in the level of openness in the economy (CGOPEN). The strong relationship between investment and trade has appeared in both equation (2) and equation (3) and also appears in the cross-correlations chart (see the appendix). This shows that a large proportion of the investment that occurs in developing countries occurs in the import/export sector of the economy. Therefore, countries that follow pro-trade policies are more likely to see the investment they so desperately want and need compared to countries that follow an import substitution policy. This highlights the importance of trade friendly policies; including low levels of tariffs and quotas, market exchange rates, and adequate foreign exchange reserves. As for per capita GDP (CGGDP), an unexpected negative and significant result was found when using OLS and robust OLS estimates. Although a positive but insignificant result was found when using

3SLS. The variables INCOME, PRICE, and EXC all have insignificant effects on the dependent variable CGOPEN in all three regression formats.

Turning to the political variables of interest, no significant results occur when changes in government (NEWGOVA and NEWGOVB) are regressed on the level of openness. Theory put forth by Cohen and Maloney (1991) explains how exporting firms hesitate before doing business in countries where future policy uncertainty is high. This theory does not prove to be in line with the results obtained in this study. Instead, according to the data, the import and export sector seem to sufficiently adjust to changes in government. Trade levels seems unaffected by the political change going on around them. For the most part, it's business as usual.

The ideology variables do show some significant results when regressed against the level of openness in the economy. Right-of-center governments (IDEOLA) have a significantly negative effect on the level of openness in the economy. This is consistent with all three regression techniques. This means that extremist governments are more successful in fostering an open economy than right-of-center governments. This is largely the result of Asian countries, which have a high level of extremists governments, being able to foster export-oriented economies. Left-of-center (IDEOLC) governments also had significant negative effects on the level of openness in the economy when looking at OLS and OLS controlling for heteroskedasticity and autocorrelation. This result does not hold up when using 3SLS. Therefore the results on left-of-center governments fairing worse than extremist governments on fostering open economies has fragile results. The results from centrist governments (IDEOLB) were not significantly different from zero. In other words, centrists government were as successful as

extremists governments in promoting international trade. This finding lends significance to the success of centrist governments over right-of-center governments or left-of-center governments in fostering international trade. Finally, the variable GOVTIME, did not have any significant results on the level of openness in the economy.

Table 6.5
SUMMARY OF THE EFFECTS OF POLICY UNCERTAINTY ON GROWTH IN THE TRADED SECTOR ($CGOPEN_{i,t}$):

Model: Comparing OLS to 3 Stage Least Squares: Dependent Var. is Change in Openness

Regressor	Regressor Definition	OLS	Robust OLS, controlling for • *groupwise hetroskedasticity* • *within group autocorrelation*	3 Stage Least Squares, controlling for • *endogeneity*
I Variables: Standard Economic Variables				
C	Constant	-.358 E-03 (-.014)	.118 E-02 (.439)	.047 (1.302)
CGGDP	Per capita growth rate	-.164** (-2.205)	-.163** (-2.135)	.402 (.982)
CGINV	Real investment growth rate	.0677*** (3.296)	.0680*** (3.234)	.213** (2.232)
INCOME	Initial 1960 real income	-.191 E-05 (-.499)	-.173 E-05 (-.467)	-.114 E-05 (-.263)
PRICE	Inflation Price Index	-.114 E-03 (-.987)	-.687 E-04 (-.606)	.178 E-04 (.135)
EXC	Exchange rate per US $	-.108 E-04 (-.462)	-.105 E-04 (-.468)	-.223 E-04 (-.835)
Z Variables: Subset of Potentially Important Variables				
GOVTIME	Control variable: measuring length of govt.	.00104 (1.215)	.977 E-03 (1.171)	.624 E-03 (.375)
M Variables: Variables of Particular Interest in This Study				
NEWGOVA	Dummy Variable: 1 = one change in govt. in a calendar year, 0 = otherwise	-.0023 (-.181)	-.006 (-.453)	-.00743 (-.513)
NEWGOVB	Dummy Variable: 1 = two or more changes in govt. in a calendar year, 0 = otherwise	-.0095 (.344)	.00478 (.169)	-.00049 (-.015)
IDEOLA	Dummy Variable: 1 = Right-of-Center Govt., 0 = otherwise	-.025** (-2.361)	-.026** (-2.455)	-.025** (-2.165)
IDEOLB	Dummy Variable: 1 = Centrist Govt., 0 = otherwise	-.011 (-.806)	-.011 (-.813)	-.0055 (-.361)
IDEOLC	Dummy Variable: 1 = Left-of- Center Govt.; 0 = otherwise	-.015* (-1.694)	-.014* (-1.717)	-.013 (-.989)
Log-Likelihood Function		641.713	605.825	566.361
Adjusted r-squared		.081	.074	-.136
F statistic		3.68	3.34	n/a
Number of Observations		1344	1344	1344

Notes: 1. t-statistics are in parentheses. 2. Time dummies have been included in all regressions.
3. * Significant at the 0.10 level, ** Significant at the 0.05 level,*** Significant at the 0.01 level, all two-tailed tests.

TABLE 6.6:
SUMMARY OF PREDICTED VS. ACTUAL EFFECTS:
OPENNESS EQUATIONS ($CGOPEN_{i,t}$)

Independent Variable	Definition	Predicted Effect	Actual Effects Robust OLS/3SLS
I Variables, Standard Economic Variables:			
CGGDP	Change in real GDP per capita (1985 IP)	Positive	Negative/No effect
CGINV	Change in real Investment share of GDP [%] (1985 IP)	Positive	Positive/Positive
INCOME	Initial 1960 real income	Negative	No effect/No effect
PRICE	Price level index	Negative	No effect/No effect
EXC	Exchange rate per US $	Negative	No effect/No effect
Z Variables, Subset of Potentially Important Variables:			
GOVTIME	Control variable: measuring how long a government has been in power	Negative	No effect/No effect
M Variables, Variables of Particular Interest in This Study:			
NEWGOVA	Dummy Variable: 1 = one change in government in a calendar year, 0 = otherwise	Negative	No effect/No effect
NEWGOVB	Dummy Variable: 1 = two or more changes in government in a calendar year, 0 = otherwise	Negative	No effect/No effect
IDEOLA	Dummy Variable: 1 = Right-of-Center Govt., 0 = otherwise	Positive	Negative/Negative
IDEOLB	Dummy Variable: 1 = Centrist Govt., 0 = otherwise	Positive	No effect/No effect
IDEOLC	Dummy Variable: 1 = Left-of-Center Govt., 0 = otherwise	Positive	Negative/No effect

Note: 1. No effect means an effect that is not significantly different from zero.

6.5 REGIONAL COMPARISONS

A natural extension of the work done here is to perform regional analysis. Means tests have already been performed in Chapter 5 to analyze the frequency of government change and government ideology by region. Further analysis by region can take advantage of the large flexible nature of the data set. Recalling the means tests from Chapter 5, it was clear that government change was frequent in Latin America and the Caribbean, was average in Asia, and was infrequent in Africa. The average government was in power in Latin America and the Caribbean for 3.54 years, while the average government in Asia was in power for 6.60 years and in Africa for 9.21 years. Changes in government had a negative effect on investment as a percentage of GDP when the entire cross-section of countries was used as the data set. A good test is to see if these results hold up when essentially similar equations are performed on a regional basis.

Using simplified regression equations that include all the necessary variables to correctly specify the equations plus dummy variables to capture a change in government, regional analysis is performed on investment as a percentage of GDP (CGINV). The results give a deeper insight into the conclusions that have already been found. Generalized Least Squares is used, correcting for groupwise heteroskedasticity, within group autocorrelation, and cross-country correlation. Using this technique does not address the endogeneity issue that was previously addressed in Table 6 using three-stage-least-squares. But it has already been concluded from the results presented in Table 6.3 that changes in government do have an effect on investment levels even when endogeneity is controlled for.

The results of regional testing indicate that there does indeed exist an optimal amount of time for a government to stay in power. Remember, when testing using the entire data set, changes in government (NEWGOVA and NEWGOVB) had a negative effect on investment levels. When testing is done on a regional basis, both Africa and Latin America and the Caribbean show a negative and significant relationship between changes in government and investment levels. This is consistent with the results found when the entire data set was used. Asia shows a break from the overall group of countries by having an insignificant relationship between changes in government and investment levels. Even when a larger amount of uncertainty is created when governments change two or more times in a calendar year (NEWGOVB), investment levels as a percentage of GDP are not significantly affected.

These findings can be attributed to the amount of political activity in the various regions. Africa has the least amount of changes in government. Therefore when governments do actually change, a large amount of uncertainty results. African governments have often times held power for long periods through undemocratic and dictatorial means. Opposition voices are often silenced. When a new government assumes power, to what extent will the new government respect the existing constitution of the country and abide by a law-and-order mentality is questionable. What direction the future government will take may be difficult to judge because there is not much history to look back on. Latin America and the Caribbean fall at the other end of the political activity spectrum. Instead of a having less than average amount of political change, Latin America and the Caribbean have a larger than average amount of political change. Governments change so often it is difficult to establish continuity in policy over

any period of time before the current government is out of power and a new government is swept into office. The average amount of government change is represent by Asia, which is not significantly different from the overall average amount of government change. By having a pattern of government change that is neither too little nor too much, the economy seems to adjust well when changes in government occur. Plus, Asia has higher investment rates than other areas of the world. This indicates that investment is a strong phenomena in Asia, a phenomena that is largely uninterrupted by the political process.

Further testing on these areas would prove to be most interesting. Only the beginning has been tapped here. Table 6.7 present the regional results .

Table 6.7
SUMMARY OF 2 GLS ESTIMATES OF THE EFFECTS OF POLICY UNCERTAINTY ON GROWTH IN INVESTMENT AS A PERCENTAGE OF GDP ($CGINV_{i,t}$) ACCORDING TO REGION

	Africa	Asia	Latin America & the Caribbean
NEWGOVA	**-.080*** (-2.721)**	**-.0092 (-.785)**	**-.0195** (-2.449)**
NEWGOVB	**-.11* (-1.786)**	**-.0425 (-1.032)**	**-.0095*** (-2.643)**
IDEOLA	-.0384 (-.345)	-.0326 (-.962)	-.0245 (-1.522)
IDEOLB	.2244*** (2.967)	.0150 (.422)	-.0072 (-.493)
IDEOLC	-.069* (-1.801)	.00513 (.107)	.0577** (2.563)
CGGDP	-.675 (-.690)	.825*** (9.103)	1.44*** (20.777)
CGOPEN	.129** (2.913)	.172*** (5.694)	.0700*** (4.136)
INCOME	.211 E-05 (.004)	.0003 (.659)	.22 E-04 (.297)
CGPOP	-.413 (-.925)	.593 (.830)	2.700*** (6.691)
PRICE	.569 E-04 (.219)	.535*** (4.787)	.00011 (.254)
CGCON	-.845*** (-9.465)	-1.518*** (4.787)	-2.032*** (-25.278)
GOVTIME	.00257 (.729)	-.0016 (-.862)	.0011 (.424)
CONSTANT	.033 (.039)	-.588 (-1.374)	-.137 (-.739)
Log-Likelihood Function	49.723	231.616	254.841
Likelihood Ratio Statistic	118.32	142.535	349.083
Number of Observations	384	352	608

Note: 1. t-statistics are in parentheses. 2. Time dummies have been included in all regressions.
3. * Significant at the 0.10 level, ** Significant at the 0.05 level, *** Significant at the 0.01 level, all two-tailed tests.

6.6 ECONOMETRIC ISSUES

A variety of econometric issues are addressed in order to clarify the econometric results. Multicollinearity, causality, endogeneity, and the use of dummy variables are discussed. Also the use of additional independent variables is touched upon.

6.6.1 MULTICOLLINEARITY

Multicollinearity occurs when two or more independent variables are highly correlated in a regression equation, thereby making it impossible to isolate the individual effects of each of these independent variables on the dependent variable. Multicollinearity can be a problem in a cross-sectional data set like the one used in this study. Although Leamer (1978) suggests that multicollinearity really reflects a weak-data problem in that there is not enough significant variation among the variables in the regression model. Albeit, finding significant partial correlations does not automatically imply that the variable of interest influences the dependent variable. Levine and Renelt (1992) support Leamer's statement on multicollinearity and suggest multicollinearity represents the difficulty in identifying a significant relationship that is not affected by the conditioning set of information.

To test for the presence of multicollinearity in the data set, pair-wise correlations among the regressors have been tested for. If the correlation coefficient between the pairs is higher than .8, then multicollinearity is very high and is a big problem. Although Gujarati points out that high zero-order correlations are a sufficient but not a necessary condition for the detection of multicollinearity. Multicollinearity can still be present even though the correlation coefficient is relatively low (less than .5). The cross correlation

chart (see appendix) indicates that the presence of multicollinearity may be present between the variables GDP and INV (cross correlation = .54) and also between INV and TRADE (cross correlation = .44). This problem is largely corrected for by transforming the data. Once the percentage change is taken for these variables, their correlation coefficients decrease significantly, diminishing the changes of having multicollinear data. Just because two variables are highly correlated, there is no evidence to suggest their growth levels will also be highly correlated. Thus, it is reasonable to assume that the level of multicollinearity is low and does not present any significant problems to the dataset.

6.6.2 CAUSALITY

The question of causality between political and economic variables is indeed an important one when conducting empirical research of this sort. One of the main areas of concern in this study is the causation between growth in per capita GDP and changes in government. More specifically, do changes in government affect the level of GDP, or does the level of GDP affect whether a government will change. A few authors have already addressed this point in other studies. Gasiorowski found that political variables influence economic variables. Campos and Nugent (1999), using Granger causality tests, look for a negative and causal long-run relationship between political instability and economic growth. The political instability measures are broken down into measures categorized as severe and moderate. Severe measures of political instability include the same measures of political assassinations, revolutions and coups d'Etats that have been discussed in other studies during the literature review in Chapter 3. Moderate measures of political instability include competitiveness and regulation of political participation;

regulation, competitiveness, and openness of executive recruitment; and the legal and operational independence of the chief executive. The data set spans 98 developing countries in an unbalanced data set spanning five year periods between 1960 and 1995. Campos and Nugent found no evidence whatsoever of causality flowing from per capita GDP growth to political instability. Evidence the other way supporting the hypothesis that political instability causes negative per capita GDP growth was moderate and statistically significant part of the time. The negative and causal relation was largest in Sub-Saharan Africa.

In order to test for this question within the context of the dataset used in this study, Granger causality tests have been performed. The Granger Test, in short, asks whether statistically one can detect the direction of causality when temporally there is a lead-lag relationship between the two variables of interest. Intuitively, it is based on the notion that an event in the future cannot cause an event in the past. In this case, change in government (NEWGOV) is said to Granger-cause change in per capita GDP growth (CGGDP) if in a regression of CGGDP on lagged CGGDP's and lagged NEWGOV's, the lagged NEWGOV's are jointly significantly different from zero. Two equations are tested. The first equation examines if changes in government have an effect on per capita GDP. The second equation examines if changes in per capita GDP cause changes in government.

Despite the simple elegance of the Granger test, a couple noteworthy concerns do arise. The main concern is that the lagged dependent variable in the right-hand-side of the equation creates a dynamic panel data problem. Essentially, the lagged dependent variable is correlated with the error term, thereby causing the OLS estimator to be biased.

The following two equations are tested:

Granger Equation 1: $$CGGDP_t = \sum_{t=1}^{n} \alpha_i \, CGGDP_{t-i} + \sum_{j=1}^{n} \beta_j \, NEWGOV_{t-j} + u_{1t}$$

Granger Equation 2: $$NEWGOV_t = \sum_{t=1}^{n} \alpha_i \, CGGDP_{t-i} + \sum_{j=1}^{n} \beta_j \, NEWGOV_{t-j} + u_{2t}$$

Based on a Akaike Information Criteria of –2.861, one lag has proven to be optimal. Higher order lag terms have a larger Akaike statistic. From the results of these equations, it can be concluded that there is no sign that changes in per capita GDP have an effect on changes in government. Although there are signs that a change in government does have a statistically significant *positive* effect on per capita GDP. Earlier results presented in Tables 6.1 and 6.2 show a negative relationship between changes in government and changes in per capita GDP and changes investment as a percentage of GDP. The fact that this result is positive when it is examined with a lagged change in government ($NEWGOV_{t-1}$), indicates that the negative reaction per capita GDP experiences when a new government comes to power may only last through out the year. Initially, capital owners will 'wait and see' in order to judge the direction of future policy changes. Once capital owners feel they have successfully estimated future policy direction, the negative effect will subside. The results are summarized in Table 6.9.

Table 6.8: Granger Causality Tests:

	OLS with Grouped Dummy Variable (Controlling for country fixed effects)		
	$CGGDP_{t-i}$	$NEWGOV_{t-j}$	Akaike Information Criteria
$CGGDP_t$	.174***	.0057 *	-2.861
	(6.256)	(1.673)	
$NEWGOV_t$	-.485	-.0099	
	(-.1.218)	(-.348)	

Notes: 1. t-statistic in parenthesis . 2. Time dummies have been included in all regressions.
3. * Significant at the0.10 level, ** Significant at the 0.05 level, *** Significant at the 0.01 level, all two-tailed tests

6.6.3 ENDOGENEITY

Given the close connection between causality and exogeneity, it is logical that the question of endogeneity be considered more in depth. Due to the nature of the data set, the issue of endogeneity arises when looking at the relationship between the length of time a government has stayed in power and the probability for a change in government. The logic is that the longer a government has been in power, the higher is the probability that there will be a change in government. This issue has largely been corrected for with the creation of the variable GOVTIME. As previously defined, GOVTIME measures how long a government has been in power. By including GOVTIME into the regression, the endogeneity problem has sufficiently been addressed. Endogeneity is also an issue because simultaneous equations are used in the model. As previously explained, the use of three-stage-least-squares (3SLS) address the simultaneous equation bias that arises.

6.6.4 USE OF MULTIPLE DUMMY VARIABLES

Dummy variables are used in this study to account for situations that are more qualitative rather than quantitative in nature. Two questions arise when addressing the use of dummy variables in this study. The first question is whether a regression equation can have too many dummy variables. The second question is whether a dummy variable can have too few observations in which the dummy variable takes on a value that indicates that the qualitative characteristic that is being measured is actually present. In other words, what if the qualitative characteristic that his being measured is only present in less than ten percent of the observations. Does this diminish the value of the dummy variable and make it unsuitable for sound econometric comparison. Addressing the first question, Gujarati (1988) in a discussion of regression analysis on dummy variables, notes that it is acceptable to extend regression models to include more than one quantitative variable and more than two qualitative variables. He warns that "the main precaution is to be sure that the number of dummies for each qualitative variable should be one less than the number of categories of that variable." The second question regarding the frequency of the qualitative characteristic pertains specifically to the dummy variable NEWGOVB in this study. Remember, NEWGOVB assumes a value of 1 if a country has had two or more changes in government in a calendar year, and takes the value of 0 if the country has not. NEWGOVB assumes a value of 1 in 2.6% of the observations. On one hand, this could potentially be a problem because 2.6% of the observations may not be enough to achieve a statistically significant estimation of the effect of the variable. On the other hand, this appears not to be a problem, since NEWGOVB does have a statistically significant estimation in the regression equations

with growth in per capita GDP growth and growth in investment as a percentage of GDP as the dependent variables. One explanation for this can be the size of the data set. Although NEWGOVB = 1 in only 2.6% of the observations, this still comes out to be 35 observations in which NEWGOVB =1. When the entire data set is analysized, this seems to be sufficient. Although when regional comparisons are made, NEWGOVB may have too few observations to be an adequate dummy variable. To accommodate for this, regional regressions were done twice, once using NEWGOVB and once without using NEWGOVB.

6.6.5 SUBSTITUTING EXPLANATORY VARIABLES

Given the nature of the empirical study, a broad array of variables could potentially be useful in order to better explain the dependent variables. Variables covering such wide areas as exchange rates, trade, tax, and other fiscal and monetary policy measures may prove useful. More specifically, a pool of potential variables include: government consumption as a percentage of GDP, exports as a percentage of GDP, the domestic credit growth rate, the interest rate, and also the standard deviation f inflation and domestic credit. Any of these measures could be substituted into the relevant equation in an effort to perform additional testing in order to provide further evidence to prove 'robustness' of the results found. This is a topic for future research.

6.7 APRAISAL OF FINDINGS

The above results tell an interesting story and are summarized in Table 6.9. Many of the results were as predicted, while others were unexpected and open the door to future research. Three strong conclusions have emerged.

First, changes in government have a negative effect on a country's investment levels. Policy uncertainty created by the presence of new governments do indeed serve as a tax on the economy due to the decrease in economic activity that results. Owners of capital prefer a "wait-and-see" attitude in order to acclimate themselves to the signals and policy environment that the new government commits too. Also, uncertainty created by the presence of new governments increase when new governments occur too often. When a government changes not just once, but twice or more in a given year, investment levels suffer to a greater degree as a result. An extension of these results applies to per capita GDP. Changes in government not only have negative consequences on investment, but also have negative consequences on per capita GDP. Given the strong correlation between investment and GDP, this relationship is not surprising. More severe levels of policy uncertainty created by two or more changes in government in one year have a direct negative effect on per capita GDP. Moderate levels of policy uncertainty created by one change in government in a calendar year does not a significant effect on per capita GDP, but through investments levels would seem to have some sort of negative indirect effect.

The second conclusion comes from the regional analysis. When the entire data set is broken down and examined on a regional level, Africa and Latin America and the Caribbean have results that are consistent with the entire data set. But Asia does not show the same results. This suggests that changes in government do not have a negative effect on investment levels when new governments occur with an average amount of frequency, as is the case with Asia. Asia also has higher investment levels compared to other regions that seem to hold up better in the face of policy uncertainty.

The third conclusion concerns government ideology and shows that right-of-center governments do not have the best effect on the macro-economy. No ideology showed clear signs of having the best effect on per capita GDP and investment. Centrists governments showed signs of having a positive effect on trade when compared to right-of-center and left-of-center governments. Centrist governments, which are in the center of the political spectrum, adhere to liberal values. This conclusion is significant because it sheds light against conventional thought that less government is better. The modern perception that exists in much of the industrialized world that smaller government, or right-of-center government's which follow a hands-off policy, is the key to growth is not necessarily as true for developing countries as it is for industrial countries. This conclusion is extremely important, especially for international development organizations and Western governments that prescribe policy prescriptions as conditions for debt relief and other types of donor aid. The best way to foster economic growth in order to better ensure re-payment of donor aid may not be to slim down the size of the government and limit its ability to influence future fiscal and monetary policy. Instead, if institutional donors and western governments could recognize that governments in developing countries that adhere to a more liberal ideology may potentially be the most economically successful, a smoother path to development may emerge.

Other noteworthy conclusions arise. Although a negative effect was expected, the presence of new governments had no effect on trade levels when one change of government in a calendar occurred. Even when two or more changes in government occurred in a calendar year, negative consequences did not surface. This implies that the traded sector isn't really so put off by changes in government. Also, concerning growth

equations using panel data, initial income, initial human capital measures, and population growth are all robust explanatory variables of per capita GDP. Investment is believed to also be a significant explanatory variable, but failed to show robustness when tested with 3SLS. This is may be due to less than perfect instruments used in the 3SLS process. Better understanding how the political process affects all areas of the macro economy is an important area of research.

Table 6.9: SUMMARY OF RESULTS

Results for CGGDP

	Constant	CGINV	CGOPEN	CGPOP	INCOME	SECED	GOV-TIME	NEW-GOVA	NEW-GOVB	IDEOL A	IDEOL B	IDEOL C
Robust OLS	.039*** (4.329)	.033*** (4.416)	-.031** (-3.089)	-.940*** (-6.034)	-.7 E-05*** (-3.733)	.00066*** (2.923)	.00007 (.206)	-.0078* (-1.668)	-.043*** (-4.214)	-.00022 (-.049)	-.00025 (-.043)	-.00018 (-.034)
3SLS	.163 (.409)	.0748 (.470)	-.130 (-.147)	-.878** (-2.559)	-.667 E-05** (-1.988)	.00061** (2.122)	-.000362 (.391)	-.00616 (-.600)	-.0283** (-1.964)	-.00074 (-.036)	.00195 (.308)	.00110 (.101)

Results for CGINV

	Constant	CGGDP	CGOPEN	CGPOP	INCOME	PRICE	CGCON	GOV-TIME	NEW-GOVA	NEW-GOVB	IDEOL A	IDEOL B	IDEOL C
Robust OLS	.120 (.897)	.653*** (6.189)	.126*** (3.207)	-.734 (-1.360)	-.304 E-05 (-.591)	.169 (1.095)	-.700 (-1.58)	-.0015 (-1.346)	-.0394** (-2.154)	-.0936*** (-2.418)	.0110 (.784)	.0114 (.616)	.00192 (118)
3SLS	.053 (.319)	.9213 (1.112)	.160* (1.649)	-.097 (-.102)	.206 E-05 (.240)	.637 E-04 (.275)	-.936 (-1.502)	-.00039 (-.110)	-.0429** (-1.991)	-.0697** (-2.116)	-.0143 (-.205)	.00045 (.017)	-.0125 (-.342)

Results for CGOPEN

	Constant	CGGDP	CGINV	INCOME	PRICE	EXC	GOV-TIME	NEW-GOVA	NEW-GOVB	IDEOL A	IDEOL B	IDEOL C
Robust OLS	.118 E-02 (.439)	-.163** (-2.135)	.0680*** (3.234)	-.173 E-05 (-.467)	-.687 E-04 (-.606)	-.105 E-04 (-.468)	.977 E-03 (1.171)	-.006 (-.453)	.00478 (.169)	-.026** (-2.455)	-.011 (-.813)	-.014 (-1.517)
3SLS	.047 (1.302)	.402 (.982)	-.213** (-2.232)	-.114 E-05 (-.263)	.178 E-04 (.135)	-.223 E-04 (-.835)	.624 E-03 (.375)	-.00743 (-.513)	-.00049 (-.015)	-.025** (-2.165)	-.0055 (-.361)	-.013 (-.989)

Notes: 1. t-statistics are in parentheses.
2. * Significant at the 0.10 level, ** Significant at the 0.05 level, *** Significant at the 0.01 level, two-tailed test.

CHAPTER 7

SUMMARY AND CONCLUSIONS

In chapter 1, the objectives of the study were outlined in the context of understanding both the importance of the political economy and the importance of economic development in bridging the gap between industrialized and developing countries. In the subsequent chapter, a discussion of property rights highlights the essential core concept of economic efficiency and the value of policy that encourages the efficient uses of economic resources and reduces uncertainty. Then a general review of the empirical and theoretical literature on the effects of uncertainty on the macro-economy was covered. Specific attention was given to policy uncertainty generated by the political process. This was followed by a detailed discussion on the theory of policy uncertainty that demonstrates how policy uncertainty acts as a tax on investment. Next, the ideas in this detailed approach were tested by developing reduced form regression equations. These equations attempt to measure how policy uncertainty created by the political process affect change in per capita GDP, investment and trade in a large cross-section of countries. Particular attention was given to the effect changes in government and government ideology have on the macro economy. Next, regional analysis was performed by looking at how changes in government affects investment levels in individual regions of the world. Specifically, Africa, Asia, and Latin America and the Caribbean were examined.

The study found that changes in government do create uncertainty and subsequently do have negative effects on investment and on per capita GDP. Also, when governments change multiple times in one year, more uncertainty is created and the economy suffers to a greater degree. Specifically, moderate levels of policy uncertainty created by one change in government in a calendar year have a direct negative effect on investment levels. As a result of this drop in investment, per capita GDP is then also indirectly affected in a negative manner. More severe levels of policy uncertainty created by two or more changes in government in one year have a larger direct negative effect on investment levels and also shows signs of having a direct negative effect on per capita GDP. These findings are significant.

When this large cross-sectional analysis is broken down into regional categories, Africa and the Caribbean have results that mirror the larger cross section data set with changes in government having negative effects on investment levels. But Asia shows a different pattern with changes in government having no effect on investment levels. This can possibly be attributed to two things. First, investment levels in Asia are higher than in other parts of the world and therefore may be more robust in functioning in an environment with policy uncertainty. Second, on average changes in government in Asia occur in regular time intervals. Government change in Asia occurs on average every 6.6 years, which is not significantly different from the overall average of every 5.4 years. Africa tends on average to have long standing governments ruling for 9.21 years and Latin America and the Caribbean have on average relatively short lived governments lasting only 3.5 years. Hence, as a region, Asia has an average amount of government

change that appears to make for a healthy co-existence of the political and economic system.

The study also examines government ideology and concludes that smaller governments, or right of center governments, can't automatically be assumed to have the best effect on the economy. Instead, centrists governments that adhere to a wide variety of concerns show signs of possibly having positive effects on the economy when compared to right-of-center and left-of-center governments. Extremists governments, either left wing or right wing in nature, were successful in stimulating high levels of investment in Asia. More research needs to be done in regards to government ideology in order to better clarify these results.

When looking at the traded sector, the presence of new governments had no effect on trade levels when one change of government occurred. Even when two or more changes in government occurred in a calendar year, negative consequences do not surface. This implies that the traded sector isn't put off by changes in government. It's business as usual.

The main interest in this study is the political economy, but other economic results have surfaced regarding the empirical specifications of growth equations using panel data. The study found that initial income, initial human capital measured in terms of secondary school enrollment, and population growth are all robust explanatory variables of per capita GDP. Investment is believed to also be a significant explanatory variable, but failed to show robustness when tested with 3SLS. This may be due to less than perfect instruments used in the 3SLS process.

The general validity of the conclusions reached in this study would naturally have to be further refined before they could be replicated elsewhere. However, it is hoped that this study will act as a catalyst for more conclusions regarding the role uncertainty generated by the political process has on the macro-economy. In a general sense, it is hoped this study can make the following three contributions to economic knowledge and issues that affect the political economy of developing countries.

The first is the focus of the study. By examining how policy uncertainty generated by the political process affects the macro-economy, a topic of noteworthy importance is getting the attention it needs. Much of the work done on policy uncertainty has been on a firm level, as opposed to an aggregate level. Also, much of the work on this topic has been performed on industrialized countries. This is largely due to the lack of availability of reliable data in developing countries. The study conducted here, by bringing attention to aggregate variables in developing countries, can serve as important knowledge to why a textbook formula to development doesn't always work. The mistake of taking what works in the industrialized world and transcribing it to developing countries is avoided here. Acknowledging that different economic and political dynamics exist in developing countries is an important step to creating successful development policy. Understanding the presence of uncertainty and the role it plays in developing countries' economies is an important area of research, especially if the global economy hopes to achieve a more uniform distribution of global income. The gap between rich and poor countries is becoming larger over time. Today, industrialized countries are focused on a wide variety of technology issues. Such vast concerns include newer faster computer networks, new discoveries in bio-technology, and a desire to better understand

the vast universe we live in. At the same time, many developing countries are struggling with a health infrastructure that is on the verge of collapse due to the demands of the AIDS crisis, mismanagement of resources, and coping with the never ending debt crisis. The global community cannot afford to become so divided. Dynamics that are in play in developing countries must continue to be analysized and addressed, so that the gap between the rich and poor can one day be overcome.

The second contribution is the data set. The study uses a unique data set that allows for direct comparison between the timing of political events and economic events. The extensive data collection effort performed in this study can be the foundations to building an on-going data source that tracks certain political events. This source can be made available to other researchers both in the economic and political fields with the intentions of developing a better understanding of the political economy. Only the beginning has been accomplished here by comparing the timing of political events to per capita GDP, investment, and openness. Many other possibilities exist. For example, by expanding the research to look at how political events affect inflation, exchange rates, and foreign vs. domestic investment, to name just a few, opens the door for many other areas of research. Also, expanding the political data set to include more measures of the political dynamics in a country would prove to be very useful. A uniform stand for evaluating the degree of central bank independence is one possible measure. Although, information on central bank independence is available, it is not readily available to researchers for a large number of countries over a long period of time. Other interesting political variables include measures on the level of democracy, human rights, and judicial protection in a country. These ideas can be taken up at a later time.

The final contribution is that the study is expected to fill some of the empirical gaps in the ongoing debate surrounding the rational expectations approach to policy uncertainty. Although literature on this subject does exist, it is mostly theoretical in nature. For example, economic literature has focused on how the political process affects the economy as an "uncertainty tax". Surprisingly, relatively little has been written on the magnitude of that tax on per capita GDP, investment, and openness. This dissertation's contribution to the empirical debate includes the three main conclusions drawn from the econometric results.

Based on the above considerations, and in order to realize the full impact policy uncertainty generated by the political process has on the macro-economy, the following suggestions are made:

7.1 *When changes in government occur, every effort should be made to have a fluid, transparent transition.* When capital owners have imperfect information on the direction of future policy, the level of investment in a country decreases. The new government has the advantage because of the level of asymmetrical information in the economy. The new government knows it's own policy intentions and needs to signal to capital owners that these intentions will be good for growth. If this does not occur, capital owners may worry that future policies may take on some other objective; whether it be political or ideological in nature. If the amount of uncertainty can be reduced to a minimum by the incoming government, capital owners will feel more assured they are closer to having all of the information they need in order to conduct business. New governments should take

advantage of the improvements in communications in order to effectively communicate their message to both domestic and international capital owners.

7.2 *Regular transitions of power in a country help contribute to economic and political stability.* On one hand, if a government changes to often, as in changing multiple times in one year, the uncertainty that surrounds the political system has negative effects on the health of the economy. On the other hand, if a country has one ruling government for a decade or more, this usually means an effective political opposition is lacking and the government may turn to policies that suit its own political objectives over the objectives of economic growth and development. Every effort should be made to have orderly transitions of power so that another change in government will only occur in a timely fashion, and not in the immediate future or in the distant next decade. This may prove to be the most healthy for the overall economy.

7.3 *A recognition that various political ideologies can be successful.* Although empirical evidence leaned slightly toward to the view that centrist ideologies may be the most successful for developing countries, the general consensus that small governments are better has not been found to be true. What works in the industrialized world should not automatically be assumed to work in the developing world. As a whole, the developing world has a wider variety of political dynamics that need to be to taken into consideration.

Nevertheless, the results obtained in this study should be considered suggestive, rather than conclusive. Several reasons for this have been discussed. First, the data used does not cover all the countries in all of the regions discussed. Although a sufficient sample was taken from each region. Second, despite the fact every effort was made to devise a uniform system for measuring government ideology, an element of subjective opinion is inherent in this type of analysis. Third, the analysis uses only two measures to describe the political system. Fourth, better defined instruments in the 3SLS regressions would help give clearer results while controlling for endogeneity. More measures and instruments can be developed over time. Despite these short coming, it does seem that the results suggest that the political system does have significant implications for the macro-economy. More important, it seems that further examination of political economy issues must proceed with a more extensive political data set and more detailed models. This will help the debate on the political economy and on development theory.

APPENDIX A

TABLE A1

Countries in the Study

Africa	Asia	Latin America & Caribbean
Algeria	China	Argentina
Cameroon	India	Bolivia
Egypt	Indonesia	Brazil
Ghana	South Korea	Chile
Ivory Coast	Malaysia	Columbia
Kenya	Pakistan	Costa Rica
Morocco	Philippines	Dominican Republic
Nigeria	Singapore	Ecuador
Senegal	Sri Lanka	El Salvador
South Africa	Taiwan	Guatemala
Uganda	Thailand	Haiti
Zambia		Honduras
		Jamaica
		Mexico
		Nicaragua
		Panama
		Peru
		Uruguay
		Venezuela

APPENDIX A

TABLE A2

CROSS CORRELATIONS

	GDP	CGGDP	INV	CGINV	TRADE	CGTRADE	CON	CGCON	POP	CGPOP	INCOME	SECED	PRICE	EXC	GOVTIME	GOVA	GOVB	IDEOLA	IDEOLB	IDEOLC
GDP	1.000																			
CGGDP	0.074	1.000																		
INV	0.540	0.263	1.000																	
CGINV	-0.012	0.205	0.116	1.000																
TRADE	0.392	0.135	0.436	0.023	1.000															
CGTRADE	-0.036	-0.015	-0.002	0.093	0.020	1.000														
CON	-0.327	-0.095	-0.495	-0.055	-0.140	0.010	1.000													
CGCON	0.020	-0.116	-0.094	-0.285	-0.047	0.060	0.115	1.000												
POP	-0.186	0.039	0.108	-0.007	-0.216	0.048	-0.150	-0.021	1.000											
CGPOP	-0.191	-0.168	-0.185	-0.053	-0.039	-0.025	0.063	0.038	-0.178	1.000										
INCOME	0.731	-0.074	0.191	-0.016	-0.033	-0.026	-0.180	0.063	-0.198	-0.088	1.000									
SECED	0.542	0.099	0.399	0.038	0.295	-0.003	-0.223	-0.022	-0.015	-0.299	0.478	1.000								
PRICE	0.089	-0.050	-0.005	-0.001	0.068	-0.015	-0.131	-0.030	-0.145	0.032	0.066	0.012	1.000							
EXC	-0.054	0.058	0.103	0.017	0.006	0.011	-0.030	-0.021	-0.005	-0.043	-0.169	-0.134	-0.087	1.000						
GOVTIME	-0.035	0.047	0.083	0.009	0.331	0.047	-0.051	-0.004	-0.005	0.029	-0.221	-0.056	-0.026	0.297	1.000					
GOVA	0.034	-0.054	0.003	-0.063	-0.066	-0.019	-0.009	-0.028	0.026	-0.016	0.061	0.008	-0.014	-0.069	-0.352	1.000				
GOVB	0.005	-0.093	-0.028	-0.066	-0.058	-0.004	-0.003	-0.017	-0.040	-0.015	0.040	-0.008	0.174	-0.054	-0.148	-0.068	1.000			
IDEOLA	0.166	0.012	0.077	0.009	0.223	-0.053	-0.057	0.004	-0.186	0.018	0.001	0.052	-0.010	-0.024	0.181	-0.019	-0.039	1.000		
IDEOLB	0.020	-0.012	-0.066	0.011	-0.090	0.007	0.058	-0.003	0.010	-0.036	0.073	0.065	-0.072	-0.049	-0.200	0.080	0.035	-0.278	1.000	
IDEOLC	0.025	-0.031	-0.111	-0.014	0.051	-0.006	0.042	0.011	0.025	0.119	0.123	-0.062	0.017	-0.067	-0.045	-0.042	-0.006	-0.344	-0.198	1.000

APPENDIX A

TABLE A3

Data Sources

Variable	Definition	Source
GDP	Real GDP per capita (1985 IP)	Penn World Tables
CGGDP	Change in real GDP per capita (1985 IP)	Penn World Tables
INV	Real Investment share of GDP [%] (1985 IP)	Penn World Tables
CGINV	Change in real Investment share of GDP [%] (1985 IP)	Penn World Tables
OPEN	Openness: (Exports+Imports)/Nominal GDP	Penn World Tables
CGOPEN	Change in OPEN	Penn World Tables
POP	Population (in millions)	Penn World Tables
CGPOP	Change in Population	Penn World Tables
CON	Real Consumption share of GDP [%]	Penn World Tables
CGCON	Change in real Consumption share of GDP [%]	Penn World Tables
INCOME	Initial 1960 real income	Penn World Tables
SECED	Initial 1960 enrollment in secondary education	United Nations Statistics
PRICE	Price level Index(PPP GDP / $US exchange rate)	Penn World Tables
EXC	Exchange rate per $US.	World Bank Statistics
GOVTIME	The amount of time the government has been in power.	Political Leaders, 1945-1997
NEWGOVA	Dummy Variable: 1 = one change in govt. in a calendar year, 0 = otherwise	
NEWGOVB	Dummy Variable: 1 = two or more changes in govt. in a calendar year, 0 = otherwise	
IDEOLA	Dummy Variable: 1 = Right-of-Center Government, 0 = otherwise	Political Handbook of the World, along with the Worldwide Directories of Political Parties and the CIA World Factbook.
IDEOLB	Dummy Variable: 1 = Centrist Government, 0 = otherwise	
IDEOLC	Dummy Variable: 1 = Left-of- Center Government, 0 = otherwise	

APPENDIX B

(7) $\varepsilon^* = (\rho + \pi)^{-1} [\Delta(I) - t - \pi\theta]$ **given**

(8) $I = N \int_0^{\varepsilon^*} f(\varepsilon)\, d\varepsilon$ **given**

**** Goal is to calculate $dI/d\pi$ and show it is < 0.**

(8) $\dfrac{dI}{d\pi} = N f(\varepsilon^*) \dfrac{d\varepsilon^*}{d\pi}$ assumed

(7) $\varepsilon^* = \dfrac{\Delta(I) - t - \pi\theta}{\rho + \pi}$

$\varepsilon^* = \dfrac{\Delta(I) - t - (\rho + \pi)\theta + \rho\theta}{\rho + \pi}$

$\varepsilon^* = \dfrac{\rho\theta - t}{\rho + \pi} + \dfrac{\Delta(I)}{\rho + \pi} - \theta = f(\pi) + g(\pi) - \theta$

(9) $\dfrac{d\varepsilon^*}{d\pi} = \dfrac{d}{d\pi}[f(\pi) + g(\pi) - \theta] = \dfrac{df}{d\pi} + \dfrac{dg}{d\pi}$

(1) (2)

(1) $\dfrac{df}{d\pi} = \dfrac{d}{d\pi}\left(\dfrac{\rho\theta - t}{\rho + \pi}\right) = (\rho\theta - t)\dfrac{d}{d\pi}[(\rho + \pi)^{-1}] = \dfrac{(\rho\theta - t)\,-1}{(\rho + \pi)^2}$

Note: the following rule was used assuming the function $f(\pi)$:

$\dfrac{d}{d\pi}\left(\dfrac{1}{f(\pi)}\right) = \dfrac{-1}{f(\pi)}\dfrac{df}{d\pi}$

(2) $\dfrac{dg}{d\pi} = \dfrac{d}{d\pi}\left[\dfrac{\Delta(I)}{\rho + \pi}\right] = \dfrac{d}{d\pi}\left[\dfrac{\Delta(I(\pi))}{\rho + \pi}\right]$

$= \dfrac{(\rho + \pi)\dfrac{d\Delta}{d\pi} - \Delta(I)}{(\rho + \pi)^2}.$

$\dfrac{d\Delta}{d\pi} = \dfrac{\partial\Delta}{\partial I}\dfrac{d(I)}{d\pi} + \dfrac{\partial\Delta}{\partial\pi} = \Delta' \dfrac{dI}{\partial\pi}$ $\qquad \dfrac{\partial\Delta}{\partial\pi} = 0$

$$\frac{dg}{d\pi} = \frac{(\rho + \pi)\Delta' \cdot \frac{dI}{d\pi} - \Delta}{(\rho + \pi)^2}.$$

(9) $$\frac{d\varepsilon^*}{d\pi} = \frac{t - \rho\theta}{(\rho + \pi)^2} + \frac{(\rho + \pi)\Delta' \cdot \frac{dI}{d\pi} - \Delta}{(\rho + \pi)^2}.$$

(10) $$\frac{dI}{d\pi} = N f(\varepsilon^*) \frac{1}{(\rho + \pi)^2} [\, t - \rho\theta + (\rho + \pi)\Delta' \cdot \frac{dI}{d\pi} - \Delta \,]$$

(7) $$\Delta(I) = \varepsilon^*(\rho + \pi) + t + \pi\theta$$

(10) + (7):

$$\frac{dI}{d\pi} = N f(\varepsilon^*) \frac{1}{(\rho + \pi)^2} [\, -\pi\theta - \rho\theta + (\rho + \pi)\Delta' \cdot \frac{dI}{d\pi} - \varepsilon^*(\rho + \pi) \,]$$

$$\frac{dI}{d\pi} = N f(\varepsilon^*) \frac{1}{\rho + \pi} [\, -\theta + \Delta' \cdot \frac{dI}{d\pi} - \varepsilon^* \,]$$

$$\frac{dI}{d\pi} [\, 1 - N f(\varepsilon^*) \frac{1}{\rho + \pi} \Delta' \,] = N f(\varepsilon^*) \frac{1}{\rho + \pi} [\, -\theta - \varepsilon^*]$$

$$\frac{dI}{d\pi} [(\rho + \pi) - N f(\varepsilon^*)\Delta' \,] = N f(\varepsilon^*) (\, -\theta - \varepsilon^*)$$

$$\frac{dI}{d\pi} = -N f(\varepsilon^*) (\, \theta + \varepsilon^*] \frac{1}{(\rho + \pi) - N f(\varepsilon^*) \Delta'}.$$

therefore $\frac{dI}{d\pi} < 0$

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ABSTRACT

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The Political Economy of Developing Countries: an Empirical Analysis

Dissertation directed by R. Richard Geddes, Ph.D.

This dissertation studies how policy uncertainty at the macroeconomic level generated by the political process influences growth, investment and trade in developing countries. Two separate but related features of the political environment – a transfer of national leadership and the overriding ideological bent of that leadership in office – are analyzed with reference to economic impacts. This work expands upon the writings of Alesina, Roubini, and Cohen, who suggest that the relationship between economic and political cycles is more complex than originally believed. Changes in the political structure of a country affect the security of property rights and lead to policy uncertainty. Thus, a government is judged according to its ability to foster an efficient marketplace where calculated risk taking will be properly rewarded. The paper takes the view that investors will use a "wait and see" attitude when adjusting to an untested government's commitment to create policies that will maximize domestic asset value. In this sense, political change and its attendant policy uncertainty impose an extra tax upon investment, especially in developing countries. As rate-of-return and convergence models fail to hold, policy uncertainty can be viewed as one explanation for why traditional formulas for development no longer succeed.

VITA

Margaret Mary LeClair, daughter of Edward and Mary LeClair, was born on December 31, 1969 in St. Paul, Minnesota. After graduating in 1988 from Hill-Murray High School in St. Paul, she entered the University of Wisconsin-Madison. In 1992, she received the Bachelor of Science in Economics with Math Emphasis.

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