Nepal's Civil War and Its Economic Costs

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## Abstract

This paper estimates the macroeconomic effects of increased spending on defense and internal security necessitated by the decade-long Maoist insurgency in Nepal. An investment equation is specified to examine the relationship between defense spending and investment. The estimation results indicate that there is a significant negative effect of defense spending on investment. A simple Harrod-Domar growth relationship is used to estimate the effect of the increase in defense spending on economic growth. This analysis suggests that between 1996 and 2006, the opportunity cost of the conflict in terms of lost output has been about 3 percent of Nepal's current GDP.

**Introduction**

This paper examines some macroeconomic effects and opportunity costs of increases in security spending by the Nepalese government to finance its war against the Maoist rebellion that began in 1996. Since that time, sharp increases in security spending by the government have resulted in a decline in real investment which, in turn, has reduced economic growth. In addition to these direct costs, the conflict has also resulted in significant indirect costs, such as disruptions in trade and commerce, loss in tourism revenue, a toll on children, loss of infrastructure, and reduction in foreign investment. Although important, these indirect costs are not the main focus of this paper, so they are examined only briefly.

Economic theory suggests that an increase in government or military spending can crowd out private investment and may lead to lower rates of economic growth and lost output. Alternatively, military spending can also lead to some positive effects on economic growth through a Keynesian-type expansion whereby an increase in aggregate demand results in increased output and employment. A number of studies have examined the effect of higher defense spending on economic growth in developing countries. Some analysts argue that military spending may have a favorable effect on economic growth. For instance, Benoit (1973, 1978) shows that military spending positively affected economic growth for a sample of 44 developing countries from 1950 to 1965. He argues that military spending increases economic growth, as it improves human capital through education and vocational and technical training. In addition, research and development as well as production activities by the military may provide positive externalities to the civilian sector. He also contends that reducing military spending in developing countries will not necessarily raise economic growth because only a small fraction of the decrease in military spending results in productive investment. However, most studies on the subject find that defense spending tends to have an adverse impact on economic growth, either directly or indirectly. Examples include studies by Lim (1983), Deger and Sen (1983), Faini, Annez, and Taylor (1984), Maizels and Nissanke (1985), Deger (1986), Chan (1986), Grobas and Gnanaselvam (1993), Roux (1996), Pradhan (2001), Arunatilake et al. (2001), and Ra and Singh (2005).

Still other studies suggest that there is no causal relationship between military expenditures and economic growth in either direction. For instance, studies by Biswas and Ram (1986), Payne and Ross (1992), and Kim (1996) found no consistent relationship between military spending and economic growth. Similarly, Dakurah *et al.* (2001) found no causal relationship between military spending and economic growth based on their study of 62 countries. The empirical literature thus suggests that the relationship cannot be generalized across countries and may depend on an array of factors including the period of study, the level of socio-economic development of the country, and how the military expenditures are financed.

The majority of the studies cited above have used a multicountry approach to examine the relationship between military spending and economic growth in developing

countries. While multicountry approaches are useful, a case study approach may be more illustrative. After all, circumstances and policy responses are likely to vary across countries and the nature of the policies pursued is likely to affect the relationship between military spending and economic growth. This paper therefore adopts a case study approach in an attempt to analyze the economic costs of Nepal's decade long civil war. The rest of the paper is organized as follows: The next two sections provide overviews of the Nepalese economy and the Maoist insurgency. The civil war's macroeconomic effects in terms of lower investment and reduced nonmilitary expenditures are then discussed. This discussion is followed by some quantitative estimates of the opportunity costs in terms of the economic growth sacrificed and lost output. Some indirect costs discussed in the subsequent section. The final section summarizes the main findings and concludes the paper.

## Brief Background of Nepal's Economy[1]

Nepal has made some encouraging progress in development since it emerged from self-imposed isolation in the 1950s, at which time it had virtually no infrastructure. Access to basic public services such as primary education, health care, electricity, and sanitation has increased significantly since that time. Almost 90 percent of Nepal's primary-aged school children are now enrolled in school. The infant mortality rate has dropped from 165 (per 1,000 live births) in 1970 to 48 in 2006. Although still among the lowest in South Asia, life expectancy at birth has increased to 63 years.

Nepal made the transition from absolute monarchy to multiparty democracy in 1990. Unfortunately, democracy also ushered in political instability; there have been 18 governments since 1990. As might be expected, there has been no coherent drive to promote economic development or to mobilize and utilize domestic revenues efficiently. The country is faced with low returns on public investments and inadequate government services. The decade-long civil war, which began in 1996, has claimed more than 13,000 lives.

Between 1990 and 2001, Nepal's aggregate GDP increased by 5.3 percent per year and per capita income increased by more than 2.5 percent as the economy responded to macroeconomic stability and liberalization, and declining population growth rates. There was also a rapid growth in trade. However, by the turn of the 21st century, intensification of the Maoist conflict and political instability, together with the effects of the global recession, led to a sharp reduction in exports, manufacturing, and tourism services. For the first time in 19 years, negative growth was recorded in 2002. A slowdown in revenue growth and a sharp increase in security expenditures created an unprecedented budget crisis. The shortfall in revenue and difficulties in implementing development programs in conflict areas reduced development spending by about 20 percent. As the budget crisis deepened in 2003, development spending, in real terms, fell to a ten-year low. GDP growth did recover in 2003 and 2004, registering a 3.4 and 3.7 percent growth rate. The corresponding growth rates for 2005, 2006, 2007 and 2008

were 2.4, 2.9, 2.7 and 5.3 percent.

During the past ten years or so, the headcount poverty rate has dropped sharply to about 30 percent, although there are wide disparities based on geography, caste, ethnicity and gender, and inequality in Nepal is the highest in South Asia. With an annual per capita income of about $470, Nepal remains one of the poorest countries in the world. Only 35 percent of the women are literate, compared to 63 percent of men. Nepal's population of 28 million is still growing at about 2 percent a year, and the ratio of population to arable land is one of the highest in the world.

## The Maoist Insurgency[2]

In February 1996, after winning only nine out of 205 seats in parliament in earlier elections, Maoist rebels launched an armed struggle to replace Nepal's constitutional monarchy with a communist republic. Given Nepal's deep rural poverty, caste and ethnic discrimination, endemic corruption, and a concentration of wealth and power, it is not surprising that the Maoist message resonated with the Nepali population. Within months, Maoist leaders created a highly organized insurgency. In August 2001, attempts at peace talks stalled after three rounds of negotiations over the question of Nepal's constitutional monarchy. In November 2001, the Maoists walked out of the negotiations, broke the ceasefire and resumed attacks on government troops. A state of emergency that lasted for 10 months was imposed, and the army was ordered to fight the rebels for the first time. Over half of the more than 13,000 deaths occurred since the army joined the fight in 2001.

The government and rebels declared another ceasefire in January 2003. However, despite several rounds of talks, the two sides could not agree on the role of the monarchy. The Maoists demanded an election to form a constituent assembly. This assembly would draft a new constitution that would offer the option of abolishing the monarchy. The government refused the Maoists' ultimatum and insisted that the Maoists either surrender their weapons or tone down their demands to fit existing laws. Some analysts suggest that the Maoist leadership was also under pressure from within its own ranks, with inured fighters eager to launch fresh assaults against government forces. The Maoists withdrew officially from the ceasefire on August 27, 2003 as peace talks between the government and Maoist insurgents collapsed. The country promptly plunged into more violence.

Even during the so-called ceasefires, both government and Maoist forces regularly breached the code of conduct that was supposed to govern their activities during the stops in fighting. Both sides believed that the other was planning an impending attack. The Maoists continued to recruit heavily and succeeded in penetrating urban areas. They continued to practice widespread extortion from businessmen, aid groups, and villagers to fill their coffers. They even fired on a motorcade of a former prime minister. For their part, the government forces continued to make their presence felt throughout the countryside and summarily executed people they suspected of being Maoists in a remote village in eastern Nepal.

The Maoists had an estimated 4,000 hard-core fighters and a militia of about 15,000.  They roamed freely in the countryside and claimed to control 80 percent of the country.  This claim may have been an exaggeration, but it was true that the government did not exist in most rural areas, which were frequented by roaming Maoist extortionists. The number of soldiers in the Royal Nepalese Army grew to about 90,0000 by 2005, up from  45,000 in November 2001 when the army was mobilized to combat the Maoist rebels.  The army headed the unified command, which included its own soldiers, 18,000 armed police and 10,000 policemen deputed from the Nepal Police.  The army was heavily armed with the help of India and the United States, which provided $17 million in military equipment and training.  The army's outdated weapons were replaced with mortars, machine guns and M-16 rifles provided by the American, Indian and Belgian governments, as well as with British and Indian helicopters.  Counterinsurgency training was provided to the government forces by expert teams from India and the United States.

In October 2002, King Gyanendra dismissed the political parties from power and was unwilling or unable to restore the democratic process.  Instead, he took over state power on February 1, 2005,declared a state of emergency, and severely curtailed fundamental rights.  Subsequently, India, the United States, and the United Kingdom froze all military aid to Nepal.  Three months later, the state of emergency was removed, primarily to appease the international community, although fundamental rights were not restored.  The king continued to strengthen his absolute powers and targeted leaders of the political parties.  This move by the king pushed the seven parliamentary parties to form an alliance (SPA) with the Maoists.  This alliance organized a mass uprising against the king, which left more than 20 dead and many more wounded.  On April 21, 2006, the king was forced to relinquish authority and indicated that "power was being returned to the people."  The Maoists agreed to a cease fire and an "armed management" process. Under this deal, both Maoist and government armies and arms were to be kept in a secure place under the supervision of the United Nations.  As the country edged toward a solution to 10 years of civil war, rivalries between caste and ethnic groups threatened the peace process.  A new crop of ethnically-based groups such as the *Madhesis* (Nepalis from the southern plains) began making separatist demands regarding an end to domination by the *Brahmins* and *Chhetris*, the two highest Hindu castes.  Fourteen months of protests reaped havoc in the southern Terai region, and scores died in ethnic and caste-based violence.  On December 28, 2007, in an almost unanimous vote, the interim parliament declared Nepal a federal democratic republic, relegating Nepal's 240-year-old monarchy to oblivion.  This historic verdict was conditional on approval by the first meeting of the constituent assembly.

The elections for the constituent assembly, which is responsible for drafting a new constitution and which also serves as the parliament, were held on April 10, 2008.  The Maoists won the most seats (220 of 601) but could not form a government because a president needed to be elected first.  In the indirect presidential election, Mr. Ram Baran Yadav of the mainstream Nepali Congress party won with 308 out of the 590 votes in the assembly, offering a setback to the Maoists' hopes of dictating the direction of

constitutional reforms.

On August 15th, 2008, after months of bickering, Maoist leader Pushpa Kamal Dahal was elected prime minister, with the support of a large majority of the constituent assembly, and a Maoist-led coalition government was formed. Trouble, however, began to brew regarding the intractable issue of the future of the armed forces. Under the peace agreement, some 23,000 Maoists guerillas were supposed to be integrated into the Nepali army, which refused to follow the injunction of the Moist-led government. Mr. Dahal sacked the army chief, but the president, who had the support of almost every other political party, reinstated him, which led to the resignation of Mr. Dahal on May 4th, 2009. On May 23rd, Madhav Kumar Nepal, the leader of the moderate Unified Marxist-Leninist (UML) party became the new prime minister. Although Mr. Nepal has the support of 21 of the 24 political parties in the assembly, the Maoists, who won 38 percent of the seats in the assembly, do not support him and have refused to join the new government.

After another round of bickering, the main coalition partners in the new government have formed a new cabinet. It is uncertain how long this government will last or if the Maoists can be coaxed back to the table. A return to civil war still seems possible. In any event, lasting peace will not obtain unless the dispute regarding the future of the two armies is resolved. Unfortunately, and as has become common in Nepali politics, uncertainty looms yet again.

## Macroeconomic Effects[3]

In 1996, when the insurgency began, security spending was about 0.9 percent of GDP. In 2006, it was 2.5 percent. By some estimates, security expenses grew by over 300 percent between 2000 and 2006, mostly due to the purchase of arms and ammunition. During 2002, spending on security increased 32 percent to $170 million in a $788 million budget to purchase advanced weapons and logistics for the police and the army to fight the insurgency. In 2006, security spending increased by 10 percent to about $280 million. As more money was pumped into the war effort, fewer funds were available for development. For an extremely poor country whose budget depends on foreign aid for a third of its total outlay, such disproportionate increases in security spending can be expected to have lingering and considerable effects.

The effects of the conflict on economic growth and welfare depend in part on how the government chooses to finance its war. One way the government can finance an increase in defense spending is to obtain the extra funds by curtailing spending in others areas such as health, education, and public investment. Another alternative is to borrow from domestic sources, from the central bank, or from abroad. Following Grobar and Gnanaselvam (1993), the macroeconomic effects of Nepal's Maoist insurgency are examined by first looking at the basic open-economy saving-investment relationship:

$$I + (G - T) = S + (M - X) \tag{1}$$

where $I$ is investment, $G$ is government consumption, $T$ is tax revenues, $S$ is private saving, $M$ is imports and $X$ is exports. Dividing government spending into defense spending ($G_D$), which includes spending on internal security, and nonsecurity spending ($G_N$), and rearranging, the above identity can be rewritten as:

$$G_D = S - I + (M - X) + (T - G_N). \tag{2}$$

Equation (2) states that higher defense spending will have to be offset by adjustments in private saving, investment, the balance of payments, taxes, or nonsecurity spending. From 1990 to 96, defense spending increased by about 67 percent, and from 1996 to 2006 it increased by 215 percent. While investment increased about 50 percent from 1990 to 1996, it declined by more than 8 percent between 1996 and 1999 and increased about 7 percent from 1996 to 2006. Similarly, while national saving increased by more than 75 percent from 1990 to 1996, it fell by 26 percent from 1996 to 2006. Finally, trade volume increased 84 percent from 1990 to 1996 but fell by 16 percent from 1996 to 2006. We see from the data that there has been a significant increase in defense spending and a decline in real investment.

Nepal continues to rely heavily on foreign savings as a source of investment finance. There has been a continued inflow of capital as the trade balance has remained negative. The trade deficit did narrow in the late 1990s, but the gap started to widen in 2003. External debt at about 50 percent of GDP in 1990 continued to increase in subsequent years, while registering a gradual decline in recent years. Total debt service as a ratio of GDP was 1.9 percent in 1990 and 1.6 percent in 2003. Total debt service as a percentage of exports was 15.7 percent in 1990, 6.2 percent in 2002, and about 5 percent in 2006.

It is apparent that the government has had to make some choices to finance its spending to fight the Maoist insurgency. The data suggests that increased spending on defense and internal security has been associated with lower investment and reduced nonmilitary government expenditure, especially in economic services. These trends are inauspicious; lower investment results on slower growth rates and lower living standards in the future. In other words, the opportunity costs of increases in defense spending are likely to be high. These costs are discussed next.

## Opportunity Costs

This section provides some quantitative estimates of the opportunity costs of the civil war in Nepal. An attempt is made to estimate the economic growth sacrificed as a result of higher spending on defense and internal security. To this end, it is necessary to estimate the effect of the increased defense spending on investment behavior. Following Grobar and Gnanaselvam (1993), a model of investment is specified in which the level of investment depends on the supply of financial resources.

Resources available to finance investment come from three sources. The first is private domestic saving, which is a direct function of real per capita income:

$$S_P = S(Y_P). \tag{3}$$

The second source is public or government saving. The ability of the government to finance investment depends on its ability to raise revenue and its other expenditure commitments. Spending on defense and internal security reduces the government's ability to finance investment. In addition, higher spending on social programs will reduce funds available for investment. Spending by the government on social programs has been somewhat lower since 1990, when multiparty democracy was restored. This reduced spending reflects the increased emphasis placed on market-oriented policies and lower emphasis on social spending. Thus, public saving available to finance investment is modeled as:

$$S_G = S_G(Y_P, G_D, D) \tag{4}$$

where *D* is a dummy variable reflecting the post-1990 period. Since several years may elapse before investment behavior is affected by government policy, the dummy variable is lagged.

The third source of investment finance is foreign saving. Capital flows (*K*) are treated as exogenous. We thus have an investment equation of the following form where investment, defense spending, and capital inflows are measured as ratios of GDP:

$$I = I(Y_P, G_D, K, D). \tag{5}$$

This study is based on annual time series data from 1980 to 2006. Data have been obtained from several sources--several issues of the *Quarterly Economic Bulletin,* published by Nepal Rastra Bank (the central bank), various issues of *Economic Survey,* published by Nepal's Ministry of Finance, the *Key Indicators for Asia and the Pacific,* available on the Asian Development Bank web site, the *International Financial Statistics,* published by the IMF, and *World Development Indicators CD-ROM 200.* As the necessary data were not readily available from any single source, it was necessary to rely on several sources. As might be expected, data from different sources were usually not compatible.

## Estimation and Results[4]

The results of the estimation (see Table 3) indicate that there is a significant negative effect of defense spending on investment, even when accounting for other variables that affect investment behavior. Per capita GDP and capital inflows have a positive and significant effect on investment behavior. The coefficient on the

government dummy variable carries the expected positive sign since government policy after 1990 has been more market and growth-oriented.

The coefficient on defense spending indicates that an increase in the ratio of defense spending to GDP of 1 percentage point will reduce the ratio of investment to GDP by about 1.3 percentage points.  Following Grobar and Gnanaselvam (1993), a simple Harrod-Domar growth model is used to estimate the effect of the recent increase in defense spending on economic growth.  Given a fixed incremental capital-output ratio (ICOR), the basic Harrod-Domar relationship for the economy is:

$$g = (s/ICOR) - d$$

where $g$ is the growth rate of output, $s$ is the saving (or investment) rate, and $d$ is the depreciation rate.

Nepal's ICOR has varied over time.  Calculated from data during the 1990-2006 period, the ICOR ranged from 2 to 2.4.  Since the Maoist insurgency began in 1996, the ratio of defense spending to GDP has increased by 1.1 percentage points.  Table 4 indicates that a 1.1 percentage point increase in defense spending, all else constant, will be associated with a 1.44 percentage drop in the ratio of investment to GDP.  Table 4 shows the corresponding change in the growth rate given different assumptions about the value of the ICOR.  The table also shows the estimates of the increased level of defense spending brought about by the insurgency in terms of reduced output as a result of lower levels of investment.  If we apply an ICOR of 2 for Nepal, the opportunity cost of the conflict in terms of lost output from 1996-2006 is about 22 billion rupees, or about $315 million, which is about 3 percent of Nepal's 2007 GDP, not a trivial amount.  In addition, the conflict has a number of other costs such as loss in agricultural production, cost of personal property, buildings and infrastructure damaged by the conflict, loss of tourism revenue, and disruptions in trade and commerce.  Some of these additional costs are discussed in the next section.

A note of caution is in order. The Harrod-Domar framework used in this study is subject to uncertainty over the value of the ICOR and the appropriate depreciation rate.  Calculated ICORs tend to vary considerably due to cyclical effects. As such, the estimation of the economic growth forgone due to the lower private investment crowded out by defense spending should be viewed only as a rough approximation.

## Indirect Costs

The Maoist conflict in Nepal has resulted in other costs. The conflict has led to a slowdown in development activities, particularly in rural areas.  The Asian Development Bank estimates that only 88 percent of the targeted government spending was realized, which has had adverse impacts on health, drinking water, roads, and agriculture.

The tourism industry has been particularly hard hit.  Tourism has been Nepal's main foreign currency earner, bringing in about 400,000 thousand visitors and more than

$650 million in revenue every year. An estimated 1.5 million people depend on the tourism industry, which contributes over 18 percent to the Nepal's gross domestic product. If properly managed, it is estimated that the tourism industry could generate employment for more than 6 million people. The escalation of the conflict with the Maoists resulted in a sharp drop in the number of tourists. Specifically, tourist arrivals fell by about 6 percent in 2000, 23 percent in 2001, 24 percent in 2002, and 3 percent in 2005. As a percentage of total exports, tourism revenue declined 24 percent in 1997, 15 percent in 2002, and 40 percent in 2005. Moreover, because tourism has a strong link with other industries, the downturn in the tourism sector had a significant negative impact on up to 80 percent of other industries in the country.

The conflict has also had an adverse impact on trade and commerce. Following trade liberalization policy, exports and imports grew rapidly for much of the 1990s. For instance, exports increased 36 percent in 1992 and 33 percent in 1994. However, exports fell by 8 percent in 1996, 14 percent in 1998, 19 percent in 2002, and 13 percent in 2003. While weak external demand and intensified competition were responsible, production disruptions emanating from the conflict played an important role. Regular strikes affected businesses and had adverse effects on foreign investments.

Some analysts have argued that children, particularly those from poor families in the remote hills, have been among the most severely affected by the conflict. According to *The New York Times* (December 9, 2004), human rights groups estimate that tens of thousands of children were abducted by Maoists and forced to attend indoctrination camps or have been sent into exile by frightened parents. The Nepalese army is also alleged to have used children as spies and messengers. Concern Center for Child Workers in Nepal, a leading child rights organization, has said that hundreds of children were killed in the violence. An estimated 5,000 children have been displaced as a result of their parents fleeing to safer towns, 2,000 children have been orphaned, and 10,000 have been denied access to education. Children have died at the hands of both the rebels and security forces, while some have simply been caught in the crossfire. Thousands of children face an uncertain future due to the psychological trauma caused by the cycle of violence. Maoist rebels in particular were blamed for using children on the battlefront. An international child rights group, the Coalition to Stop the Use of Child Soldiers, says that children normally began working as porters and messengers and then often ended up on the frontline. Security forces were also accused of victimizing innocent children on suspicion of collaborating with the rebels. According to a recent survey, less than 37 percent of children were vaccinated in two districts affected by the rebellion, compared with a national average of 75 percent. Attacks on teachers forced many teachers to leave, affecting the education of children.

## Summary and Conclusion

This paper has estimated some effects of increased military spending associated with Nepal's decade-long civil war that began in 1996. Clearly, the most serious cost of the conflict has been the loss of over 13,000 lives, but there are clear economic costs of

the conflict as well. This paper has focused on the macroeconomic effects of increased security spending as a result of the conflict. Nepal has made some encouraging progress in development since it emerged from self-imposed isolation in the 1950s. After the transition from absolute monarchy to multiparty democracy in 1990, economic performance was encouraging. However, weak political leadership, continued political instability and, more recently, the Maoist insurgency, have all exacted a severe toll on the economy.

After brief overviews of the Nepalese economy and the Maoist insurgency, the macroeconomic effects of increased government spending on defense and internal security were discussed. Increased defense spending resulted in a decline in real investment as well as a reduction in spending on economic services. An investment equation was specified to examine the relationship between defense spending and investment. After a battery of tests, an error correction model was developed and estimated. The estimated results indicate that there is a significant negative effect of defense spending on investment, even when accounting for other variables that affect investment behavior. Next, a simple Harrod-Domar growth relationship was used to estimate the effect of the increase in defense spending on economic growth. This analysis indicates that from 1996 to 2006, the opportunity cost of the conflict in terms of lost output has been about 3 percent of Nepal's current GDP. In addition to these direct costs, the paper has argued that lost tourism revenue, disruptions in trade and commerce, and a significant toll on children represent some significant indirect costs of the conflict.

Finally, as noted above, data challenges, particularly in obtaining values for the appropriate ICOR and depreciation rates, have been significant. As such, the results obtained above using the Harrod-Domar framework should be viewed only as broad orders of magnitude. They are intended to be a rough approximation of the economic growth forgone due to the private investment crowded out by increased spending on defense.

| Table 1 |||
| Unit Root Test (variables in first difference) |||
| Variable | Augmented Dickey-Fuller Test | Phillips-Perron Test |
| --- | --- | --- |
| $I$ | -5.83*** | -5.96*** |
| $Y_P$ | -4.72*** | -4.93*** |
| $G_D$ | -5.23** | -5.87*** |
| $K$ | -6.16*** | -7.62*** |
| Note: ***significant at 1% level; **significant at 5% level. |||

| Table 2 Johansen's Cointegration Test | | | |
|---|---|---|---|
| $H_o$ | Likelihood Ratio | 5% Critical Value | 1% Critical Value |
| $r$ #0 | 122.6** | 84.25 | 93.28 |
| $r$ #1 | 96.4** | 58.41 | 66.24 |
| $r$ #2 | 66.3** | 37.62 | 44.57 |
| $r$ #3 | 32.8* | 19.53 | 25.49 |
| Note: **rejection of hypothesis at 1% level; *rejection of hypothesis at 5% level. | | | |

| Table 3 Estimation of Equation (6) | |
|---|---|
| Variable | $\varDelta I$ |
| *Constant* | 0.231 (1.187) |
| $\varDelta Y_P$ | 0.124 (3.426)*** |
| $\varDelta G_D$ | -1.281 (3.031)*** |
| $\varDelta K$ | 0.317 (4.481)*** |
| $\varDelta I_{-1}$ | 0.518 (2.981)** |
| *Dummy* | 1.978 (1.594) |
| *EC* | -1.147 (3.128)*** |
| *Adjusted $R^2$* | 0.721 |
| *Durbin-Watson* | 1.875 |
| *Breusch-Godfrey* | 0.782 |
| *F* | 3.729*** |
| *RESET F* | 1.231 |
| Note: ***significant at 1% level; **significant at 5% level. | |

| ICOR | Projected Percentage-Point Drop in Growth Rate by 2006 | Estimated Loss of Output, 1996-2006 (Millions of 1994/95 Rupees) |
|---|---|---|
| 2.0 | 1.17 | 22,275 |
| 2.5 | 0.93 | 17,706 |
| 3.0 | 0.78 | 14,850 |
| 4.0 | 0.59 | 11,233 |

Table 4
Estimated Economic Effects, 1996-2006

**Acknowledgements**

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[1]Data in this section have been obtained from the World Bank and Asian Development websites.

[2]Some of this discussion is based on the International Crisis Group's Asia Briefing Paper: "Nepal: Back to the Gun," October 22, 2003.

[3]Data in this section have been obtained from the Asian Development Bank, Nepal Rastra Bank, and World Bank websites.

[4] Before carrying out the estimation of equation (5), it is important to test for the stationarity of the data series in order to avoid spurious regression. Following Nelson and Plosser (1982), an augmented Dickey-Fuller test is conducted using the constant term and trend. In addition to the Dickey-Fuller test, the Phillips-Perron test (Phillips, 1987; Phillips-Perron, 1988) is also conducted to ensure the stationarity of the data series. The Phillips-Perron test uses a non-parametric correction to deal with any correlation in the error terms. Both tests indicate that most of the data series are non-stationary at the level and they all are stationary at the first-difference level. The test results are reported in Table 1.

After establishing the stationarity of the data series, Johansen's cointegration test (Johansen, 1988; Johansen and Juselius, 1990) is conducted to examine the long-run relationship among the variables. This involves the test of cointegrating vectors. The cointegration test results, reported in Table 2, suggest that the hypothesis of no cointegration is rejected. The existence of at least one cointegrating vector indicates that a long-term relationship among the variables exists. Following Engle and Granger (1987), an error correction model is developed, which involves estimating the model in first-difference form and adding an error correction term as another explanatory variable. The error correction term is the lag of the estimated error term, derived by regressing the dependent variable with the independent variables in the model. The error correction model developed is as follows:

$$\Delta I = b_0 + b_1 \Delta Y_P + b_2 \Delta G_D + b_3 \Delta K + b_4 \Delta I_{-1} + b_5 Dummy + b_6 EC + v \qquad (6)$$

where $EC$ is the error correction term and $v$ is the random error term. To ensure the absence of specification error, a RESET test (Ramsey, 1969) was also conducted. To ensure the absence of any serial correlation, in addition to the Durbin-Watson test, the Breusch-Godfrey LM test was also conducted. Statistics for both of these tests indicate that the estimated results do not suffer from any serial correlation. The estimation of the error correction model is reported in Table 3.

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