Awarded Theses
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Joint Japan/World Bank Graduate Scholarship Program
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Foreword

The Joint Japan/World Bank Graduate Scholarship Program (JJ/WBGSP) was initiated in 1987 by the government of Japan at the World Bank Institute to encourage and strengthen human resources development in developing countries. The program’s mandate is to provide to mid-career professionals in developing countries an exposure to the latest techniques and knowledge on development through graduate studies. Since its inception, the JJ/WBGSP has awarded a total of 3,554 scholarships for studying in 250 universities in 32 World Bank member-countries through the sole funding of the Japanese government.

In 2005, the JJ/WBGSP launched the Scaling-Up Program as a better means for leveraging knowledge acquired by the sponsored scholars and to foster a network of development practitioners, including JJ/WBGSP scholars and alumni. The JJ/WBGSP has been providing opportunities for scholars to generate new knowledge for development. The World Bank recognizes that there is a great opportunity to tap into this knowledge, which would benefit not only the scholars but also the development community. During its first year of activity, the Scaling-Up Program held two regional conferences and started developing the community of scholars and alumni. The regional conferences, both held in May 2006, provided an opportunity for alumni to hear outstanding papers presented by the scholars, and to network, share knowledge, and discuss current development issues in the presence of the World Bank staff and Japanese government representatives.

The high-profile attendees for these conferences included (in alphabetical order, with honorifics omitted): Kabir Ahmed, Chief Administrative Officer and Supervising Manager for JJ/WBGSP, WBI; Colin Bruce, Country Director for Kenya, World Bank; Daisuke Matsunaga, Minister, Embassy of Japan in Vietnam; Satoru Miyamura, Ambassador of Japan to Kenya; Kilemi Mwiria, Assistant Minister for Higher and Technical Education, Ministry of Education, Kenya; Yoshio Okubo, Executive Director Representing Japan, World Bank; Toshio Oya, Alternate Executive Director to World Bank Representing Japan; Cao Duc Phat, Minister of Agriculture and Rural Development, Vietnam; and Klaus Rohland, Country Director for Vietnam, World Bank.

This publication is a very first attempt by the JJ/WBGSP, and it is our pleasure to deliver the six selected papers that were presented and awarded in Kenya and Vietnam. The wide range of research fields covered the following topics: A Study of Roadside Slope Management in Bhutan by Chimi; Long-run Effects of Fiscal Deficit on Economic Growth in Ghana, 1970–2000 by Bernice Serwah Duodu, Determinants of Health Status in Kenya by Edward Muchiri Gakunju, Responses to Poverty and Risks in Vietnam: How Effectively Does the Current Public Safety Net Target Vulnerable Populations? by Quynh Ngoc Nguyen, Determinants of the Trade Balance in Tanzania, 1970–2002 by Mbayani Saruni, and Adaptability of E-government Policy in Mongolia: A Comparative Study with Japan by Odgerel Ulziikhutag.

We are happy to tell you that all the authors of these six reports now occupy important positions in government organizations in their home countries, and they have committed themselves to keeping the network alive. We are grateful to the government of Japan for its funding that made it possible to bring out all the scholars who are represented here by these six authors.

We hope this knowledge extended by the JJ/WBGSP scholars will be of interest to you.

Tsutomu Shibata
Senior Adviser
Scaling-Up Program, JJ/WBGSP
1

A Study of Roadside Slope Management in Bhutan

Chimi

This report is an attempt not only to demonstrate an alternate approach to applying soil bioengineering to stabilize roadside slope but also to demonstrate its applicability in the day-to-day maintenance of roads in Bhutan. The study was carried out to seek an economic, ecological, and easy-to-apply approach to road maintenance. Soil bioengineering has been introduced in Bhutan, but so far has not attained its optimal use there. The study therefore focused on finding a soil bioengineering approach that would increase its successful use in rehabilitating roadside slopes. Field trips in and around Yokohama and Tokyo offered an opportunity to study the success of the Miyawaki method of reforestation in stabilizing or rehabilitating failed slopes in Japan. A phytosociological study of vegetation was carried out to identify the appropriate species for plantation. The Braun-Blanquet approach was used to analyze data on vegetation, and a trial plot of land was maintained and observed for a year to evaluate the applicability of the Miyawaki method of reforestation on Bhutan’s roadsides. Results indicate that the method will be useful in stabilizing roadside slopes and should be made an integral part of routine road maintenance.

Bhutan, located in the Himalayan ranges, is a very mountainous country. It covers an area of 40,076 square kilometers. Its mountains are high and rugged; and an intricate network of deep valleys, ravines, and depressions earmarks water courses and drainage basins. Bhutan’s biotic features are as diverse as its geophysical features. Through its natural endowments and biological diversity, the kingdom has acquired special global significance. With a population exceeding 634,000 people, Bhutan is one of the least densely populated countries, and approximately 79 percent of the people live in rural areas.

Because of its location in the Himalayan ranges, almost all roads in Bhutan are built by cutting into the mountain slopes. In addition to the challenges of building roads in such difficult terrain, maintaining existing roads is of great concern. There are many problems in operating a road network in a country with difficult geological characteristics and scarce financial resources, and resolving those problems requires finding an economical means of maintaining the existing road network. Understanding the geological features of Bhutan is essential to understanding the problems associated with road operation there. Past studies and various earlier projects have indicated that landslides and soil erosion are the main causes behind the high cost of operating Bhutan’s road network. Although it has not been widely used, roadside soil bioengineer-

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The author is a master’s degree candidate at Yokohama National University, Japan. This chapter is based on her thesis, submitted in partial fulfillment of requirements for a master’s degree in infrastructure management. The author’s email address is chimi_moc@hotmail.com. I am most grateful to my academic adviser in the Yokohama National University (YNU) Graduate School of Environmental and Information Sciences, Prof. Dr. Kazue Fujiwara, for her kindness, support, and guidance throughout my study there. Her wisdom and guidance have led me to complete my thesis. I also would like to thank the professors and staff of the Infrastructure Management Program. They have rendered all possible help to make my study and stay in Japan a memorable and fruitful experience. And last, I thank the Joint Japan/World Bank Graduate Scholarship Program for its useful support, and the International Graduate School of Social Sciences, YNU.
ing always has been viewed as a cheaper alternative solution to civil engineering structures when used for stabilizing slopes and controlling erosion.

The study reported here had two objectives:

1. Identify an alternative approach to implement soil bioengineering for roadside slope maintenance
2. Identify routine maintenance activities for better efficiency and cost effectiveness.

My initial literature review concentrated on various aspects of Bhutan’s road maintenance and management and on the country’s geological setting. After obtaining a clearer perspective on road operation and related problems, I divided the study into three main components. The first portion of the study analyzed Bhutan’s road maintenance problems overall, and focused particularly on roadside soil bioengineering and plant communities.

The second part of the study involved maintaining a trial roadside plot selected as representative of a typical roadside slope failure. To supplement what I had learned in my study of plant communities, I also carried out a vegetation survey on eight roads in the country’s western region.

In the third part of the study, I gleaned lessons from slope maintenance experience in Japan, where rehabilitating failed slopes with appropriate planting is exemplary.

**Topography and Floristic Ecosystems**

Bhutan’s prevalent topographic features are the high Himalayas close to the northern border and the large mountain ranges and deep valleys that run southward (figure 1.1). The topography is dominated by ridges oriented north to south and by the five major river systems. The mountain slopes are mostly steep and long, with close to limiting angles of stability (Chencho Norbu et al. 2003). The steep and unstable terrain and the relatively young mountain system render the country ecologically very fragile.

The kingdom has extensive biological diversity. Forests in Bhutan can be divided into three major zones based on altitude: an alpine zone at 4,000 meters; a temperate zone between 2,000 and 4,000 meters, which contains the major conifer and broadleaf forests; and a tropical zone that lies between 150 and 2,000 meters and contains tropical and subtropical vegetation.

The general climatic conditions are hot and wet in the south, dry and cold in the north, dry and warm in the inner valleys, and alpine-arctic in the high Himalayas. Southern Bhutan receives heavy and intense orographic rainfall, with annual means in the range of 2,500–5,000 millimeters, and precipitation decreases northward. In general, 80 percent of the rainfall occurs during the summer months of June to September, and it can vary within relatively short distances because of rain shadow effects.

**Road Network**

*Layout and Road Location*

Bhutan has just over 4,100 kilometers of roads. Most of the road network was constructed between 1961 and 1987, and the work was done manually and with minimal use of technology. The road network layout is dominated by one major highway traversing the country from east to west and four north-south roads that connect to it. Historic trends in road construction show that from 1961 to 1987, as construction costs rose, shorter and shorter roads were built. Not only has the cost of construction increased tremendously, but also the expense of maintaining the roads has risen a great deal.

If the road network layout (figure 1.2) is superimposed on a topographic map of the country, we find that the current road network is built within the middle and lower Himalayan ranges
Figure 1.1. Main Topographical Features

Source: Bruno Bonansea was responsible for map design.
Figure 1.2. Road Network Map

Source: Bruno Bonansea was responsible for map design.
corresponding to the alpine, temperate, and tropical zones. The road system, mainly consisting of the east-west highway, goes through very high passes, many of which experience freezing conditions in winter.

Problems Associated with Road Maintenance

Roads and their construction have great potential to disturb the delicate balance of existing land forms and the local environment. Geological conditions in Bhutan, further aggravated by high precipitation, make it extremely difficult and costly to build and maintain roads. Because all the roads in Bhutan are built by cutting into mountain slopes, there are free-cut faces that are prone to continuous erosion and seepage. Landslides caused by inappropriate construction techniques, slope instability, and inadequate drainage are major problems. Significant numbers of landslides along the roads are caused by other factors as well, such as construction of irrigation channels, logging, quarrying, cultivation practices, and inappropriate disposal of excavated materials.

Introducing environmentally friendly road construction (EFRC) methods in 1999 was expected to reduce environmental damages resulting from road building. The method, introduced initially for roads constructed with World Bank assistance, involves the following features: balanced cut/fill, transport of loose spoil materials to predesignated dumping yards to reduce damage caused by their disposal over the valley slopes, good side/cross drains, soil bioengineering, and so forth. Cost estimates for roads built with the EFRC method show that the initial cost is approximately 30 percent higher than the conventional construction method (RGoB 1999). In the long run, however, roads built with EFRC methods are expected to be more economical because of lower routine maintenance requirements and less geological disturbance at the time of construction.

The photos in figure 1.3 show typical conditions along the existing roads in Bhutan. Because the roads are cut into mountain slopes, the roadside slopes are regularly damaged by mudslides, especially during the monsoon season. Very frequently, the roadside slopes are not protected against failure, even by such engineering structures as retaining walls. These conditions lead to two principal problems: extensive monsoon restoration and very costly routine maintenance.

High Cost of Monsoon Restoration. Monsoon rainfall is a major cause of road deterioration in Bhutan. The quality of the road network is diminished every year by the monsoon rains. Restoring the roadways normally is categorized as “emergency maintenance” simply because expenditures to repair the damage are unpredictable. The restoration work includes landslip clearance, repair of washouts, and repair and construction of retaining structures to stabilize the slopes. Figure 1.4 shows the trend of monsoon damage restoration costs over a five-year period, 1999–2003. During 2001, expenditures exceeded Nu. 190 million, which is more than Nu. 47,500 per kilometer of road. (In Bhutanese ngultrum, Nu. 45 is approximately US$1.)

Routine Maintenance. Problems resulting from monsoon rains also lead to higher general maintenance costs. An overview of the routine maintenance system reveals that the budget set for maintaining each road depends on that road’s classification (or the importance of each class): national highway, district road, feeder road, or urban road. Roads in Bhutan, however, have varying physical conditions over very short distances, so allocating funds and prioritizing activities on the basis of road category may produce arbitrary funding that does not take into account the actual location or condition of a road.
Figure 1.3. Representative Roadside Slope Problems

A typical slope above the road where the cut face of the slope continuously suffers from landslides. This picture, taken near Relevé BH4 (Dochula at an elevation of nearly 3,000 meters), also reveals the typical quality of the soil at high altitude sections of road in Bhutan. The soil is sandy with very thin topsoil.

A gabion wall is usually constructed at marshy locations because it lets water from the hillside flow freely and because the entire wall will not fail at the same time. The gabion wall along this newly constructed road has failed to prevent the deep-seated landslide that occurred at a location much higher than the gabion wall was constructed to withstand.

This retaining/breast wall has failed because the slope has suffered a new landslide from a higher location.

Source: Department of Roads, Thimphu.
Soil bioengineering is an age-old technique that uses living plants for engineering purposes (Lewis 2000). It is an integrated technology that uses engineering practices in conjunction with ecological principles to design and construct a vegetative living system that prevents erosion and landslides (Bayfield, Barkar, and Yah 1992). Unlike other applications where plants are chiefly an aesthetic component, plants in roadside soil bioengineering are an important structural component. Their developing root systems control erosion, stabilize slopes, and restore the landscape. The basic goal of soil bioengineering is to accelerate site recovery by mimicking what would happen naturally. Whenever soil erosion or landslides occur, either naturally or as a result of human actions, the bioengineered site begins to heal itself. The slope adjusts and vegetation establishes itself when the angle of repose has settled.

Soil bioengineering was introduced in Bhutan toward the end of the 1990s, with the publication of Bioengineering in Bhutan: Interim Manual for the Road Sector on Bioengineering Techniques for Slope Protection and Stabilisation (RGoB 1999) and Rural Access Project: Field Handbook on Bioengineering (RGoB 2002). Application of the technique, however, has not yet reached a desirable scale (perhaps because of limited related knowledge and limited funds). Retaining structures commonly are used to stabilize failed slopes along the road network, and roadside planting is included in neither the routine maintenance activity list nor any other work classification. Environmental protection and preservation is a major national goal in Bhutan, so it is timely and suitable to develop a means for enhancing the way soil bioengineering is used to maintain and repair roads—and thus protect and preserve the environment as economically as possible.

Current methodologies (RGoB 1999, 2002) outlined for roadside slope stabilization need to be reviewed to achieve better success or to trigger wider use. Therefore, instead of continuing with the existing manuals and methods, it is critical to explore alternative approaches to roadside soil bioengineering that offer greater likelihood of success.

It is true that soil bioengineering is inadequate in controlling for deep failures and major landslides, but much of Bhutan’s slope instability is shallow seated and begins in a small way, spreading only if unchecked. Erosion areas often begin small and expand over time to a size that requires costly traditional engineering solutions. Therefore, implementing soil rehabilitation

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1. Because there is ample literature available about soil bioengineering, the discussion here is limited to a few general points about the advantages and possible benefits of bioengineering and about the status of its adoption in Bhutan.

2. Research has shown that trees and shrubs can provide deeper slope reinforcement than can grasses (Grimshaw and Helfer 1995).
methods with bioengineering provides economic savings. Robinson, Danielson, and Snaith (1998, p. 4) have stated convincingly that US$1 of expenditure on road maintenance results in US$3 of savings to the road users.

Phytosociology Study

Plants are the most important component of soil bioengineering. The success of stabilizing slopes with plantings depends to a great extent on the plants’ survival success. And that survival depends on selecting the right plants for each site. Therefore, to apply this methodology successfully, we need to understand plant phytosociology—the characteristics, classifications, relationships, and distribution of plant communities (Mueller-Dombois and Ellenberg 1974). It is useful to collect related data to describe and understand the population dynamics of a species and how it relates to other species. To gain a practical understanding of the plant community and the potential natural vegetation available for slope bioengineering, in March 2004 I conducted a phytosociology study along roads in the western region of Bhutan, surveying eight plots adjacent to the roads. These plots, located within an elevation of 1,200–4,000 meters, are adjacent to roads with high human traffic—logging, grazing, cultivation, and settlement. I understood that detailed study was needed to identify species of vegetation that are native to the area and likely to survive the road use.

To analyze the data collected during this field survey, I used Braun-Blanquet table analysis (Mueller-Dombois and Ellenberg 1974). In these tables, the species common to several relevés are identified and emphasized, and attention is paid to the species that are characteristic of the plot being studied. These common species groups are key to identifying vegetation units. My analysis comprised three stages. First was the field survey in which I recorded every individual species I found. The second stage involved table analysis in which I tabulated the field relevé data in three subsequent tables—the raw table, the frequency table, and the differential table. In the third stage I compiled the summary of vegetation. It comprised five vegetation groups: temperate (Alnus) forest, moist subtropical forest, subalpine coniferous forest, Quercus forest, and pine forest. The vegetation summary data are shown in table 1.1. Available data on rainfall show that the western Bhutan areas where the eight study plots were located receive monsoon rainfall, with maximum precipitation occurring between July and August, and have dry winter seasons.

Miyawaki Method

In my effort to identify the most beneficial approaches to bioengineering for Bhutan, I studied the Miyawaki method of reforestation as it has been used in Yokohama and Tokyo, Japan. The method, also known as environmental protection forestry (Miyawaki, Fujiwara, and Ozawa 1993), is characterized by (1) use of native species, (2) dense and mixed plantation, and (3) use of potted seedlings. See figure 1.5 for a schematic representation of the method.

The method reconstructs the complex forest ecosystem by means of woody plants. Based on the principles of forestry and ecology, the Miyawaki method has applied the fundamental theory of potential natural vegetation as well as natural succession of efficient vegetation reconstruction. Simply stated, this method of site recovery mimics the natural vegetation of an area. It also shortens the considerable successional time required to reach an area’s climax vegetation (that is, the natural vegetation ecology of that area). This method of recovering eroded sites has been applied in Japan, where more than 300 successful cases have been recorded (Miyawaki, Fujiwara, and Ozawa 1993). The method can prevent the risks inherent in monoculture planting, which is vulnerable to harmful insects, landslides, and so forth.

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3. Completion of the raw table revealed 262 different species of plants recorded in the eight plots surveyed.
Results of the Phytosociology Study

The findings from my phytosociology study and visual inspection have produced species recommendations for soil bioengineering along the roads surveyed (table 1.2). The most desirable site characteristics are identified for each recommendation.

Because of their steepness, however, roadside slopes may need to be made less acute, with the angle of slope/gradient lowered prior to planting. This can be done by providing bamboo mats or preparing stepped fencing with pieces of cut wood and split bamboo. Use of bamboo mats also is recommended for gentle slopes with grainy or sandy soil conditions to prevent erosion of the surface by rain or the effect of gravity over time. Wooden crib walls will be effective as a retaining structure in lower altitudes with higher rainfall intensity. For more seriously eroded roadside slopes or minor landslide areas, gabion walls filled with rocks or earth are recommended because gabion walls are flexible to pressure.

Experimental Plot

During the study, I also selected and maintained an experimental plot on Dechencholing-Tango Road, very close to vegetation survey plot BH8. The plot was typical of a slope failure along the road. Immediately after the initial landslide during the 2003 monsoon, a stone masonry retain-
ing wall was built to contain further failure. A year after that first landslide, the failed slope still
looked bare. Visual inspection revealed that the slope appeared fragile and vulnerable, particu-
larly during the subsequent monsoon.

The site, a subalpine coniferous forest, was rehabilitated with plantings during my period of
observation (see table 1.3). The trial plot’s natural vegetation is listed in table 1.1 under columns
BH1, BH2, and BH8.

Because potted seedlings (as suggested for the Miyawaki method) were unavailable, I col-
lected saplings from neighboring forests. I gave the saplings simple treatments, such as leaf re-
moval to prevent water loss through transpiration prior to root formation. Following the princi-
ples of the Miyawaki method, I planted three to four saplings in a square meter and mulched
the surface with leaf litter.

Table 1.3 shows the saplings’ survival rates five months after planting. Given that the plant-
ing experiment was carried out with no slope dressing or preparation, that there was no main-
tenance whatsoever, and that the trial plot was subjected to sporadic grazing, the saplings’ rates
of survival are impressive; and they imply that a more planned application will be successful
and economically beneficial, and will enhance the aesthetics of the roadside slopes. The pro-
gressive development of the site from late March 2004 to May 2006 is depicted in the figure 1.6
photos. It is clear that, with some small assistance, nature will rehabilitate itself. With a little
care, wild saplings can be used in place of the potted seedlings suggested in the Miyawaki
method. The trial also demonstrated the use of native species and a plantation method that dif-
fers from the methods outlined in the existing handbooks, and it helped raise awareness about
the importance of soil bioengineering.

Japanese Example

I made field visits to areas around Yokohama, Japan, to gain insight on slope maintenance there.
Overall, I noted that the methods used to stabilize roadside slopes are highly resource intensive,
but there also are places where soil bioengineering has been used effectively for this purpose. In
Tochigi Prefecture, Enna Road, Nasu-Shiobara, passes through terrain very similar to the roads
in Bhutan. The road, constructed by cutting into mountain slopes, is characterized by frequent

Figure 1.5. Conceptual Application of the Miyawaki Method Combined with Soil Bioengineering to
Stabilize Roadside Slopes

Source: Author’s illustration.
Table 1.2. Species Recommended for Planting in Areas Studied, Classified by Site Characteristics

<table>
<thead>
<tr>
<th>Recommended species Zone</th>
<th>Altitude (m)</th>
<th>Rainfall</th>
<th>Roads in this location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rhododendron spp., juniperous recurva, Yushania spp. Subalpine coniferous forest</td>
<td>2,930</td>
<td>Less</td>
<td>Dochula</td>
</tr>
<tr>
<td>Rosa spp., Rhododendron spp., Quercus, Yushania spp., Salix spp. Pine forest</td>
<td>2,390–2,930</td>
<td></td>
<td>Dechencholing, Genekha</td>
</tr>
<tr>
<td>Quercus spp., Symlocos lucida, Rhododendron arboreum, Alnus nepalensis Warm, temperate forest (Alnus/Quercus forest)</td>
<td>1,890–2,130</td>
<td></td>
<td>Thimphu-Phuentsholing Highway</td>
</tr>
<tr>
<td>Cinnamon bejogota, Elaeocarpus sikkimensis, Michelia velutina, Hovinia dulcis, Prunus undulata Subtropical</td>
<td>1,630</td>
<td>More</td>
<td>Tashithang-Damji Road</td>
</tr>
</tbody>
</table>

Source: Author’s calculations.

Table 1.3. Record of Vegetation on the Trial Plot

<table>
<thead>
<tr>
<th>Genus and species Local name</th>
<th>Number of saplings planted</th>
<th>Number of saplings surviving after five months</th>
<th>Survival rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yushania microphylla Bamboo</td>
<td>35</td>
<td>30</td>
<td>86</td>
</tr>
<tr>
<td>Salix tetrasperma Willow</td>
<td>55</td>
<td>38</td>
<td>69</td>
</tr>
<tr>
<td>Pinus wallichiana Pine</td>
<td>6</td>
<td>4</td>
<td>67</td>
</tr>
<tr>
<td>Osyris arborea Zu</td>
<td>6</td>
<td>4</td>
<td>67</td>
</tr>
<tr>
<td>Daphne bholua Shugu shing</td>
<td>5</td>
<td>3</td>
<td>60</td>
</tr>
</tbody>
</table>

Source: Author’s calculations.

landslides. Although constructed at an initial cost of approximately ¥10,000 million, Enna Road is now closed to public use because of the high cost of maintaining it. Despite its closure, the prefecture continues to maintain it, using gabion box walls rather than concrete structural walls. The gabion boxes are more in keeping with the area’s dense vegetation, and many places along the roadside have been stabilized with plantings and Miyawaki reforestation.

Other places I visited in Japan were the Shonan Village in Hayama, Yokohama, and the campus of Yokohama National University. Both of these places originally were abandoned golf courses, and now are transformed entirely. One striking feature is that both these areas have been rehabilitated with the Miyawaki method of reforestation. See figure 1.7 for photos of plots successfully stabilized and recovered by this method.

Although there are financial, technological, and resource differences between Japan and Bhutan, the success of the method in Japan suggests it will be successful in Bhutan. Japan is a resource-rich country that could have selected any modern technology to restore and maintain land, but it took the ecological path and found that it worked. Bhutan is a resource-poor nation with all the more reasons to try this less costly method and expect the same success.
Conclusions

Despite the small size of the country, Bhutan’s topography and environmental conditions vary widely. Maintenance of roads, therefore, must be rooted in the specific nature of the surrounding environment. Current maintenance practice is fairly arbitrary, and there has been little change in road maintenance or management over time. With the expansion of road networks, it will be uneconomical if alternatives or supplementary approaches are not explored. The problem of roadside slope instability has prompted the Royal Government of Bhutan’s Department of Roads to experiment with soil bioengineering, but it has done so sporadically. At this point, bioengineering has no widespread importance and has been given only nominal application, except in some externally funded projects.

Against the backdrop of construction and maintenance methods occasioned by the lack of financial resources, I studied the broader application of roadside soil bioengineering as a method of day-to-day road maintenance in Bhutan. I wanted to show that stabilizing soil with plantings will go a long way as a cost-saving measure if attempts are made at an early stage, and that the technique will be more widely applied if the probability of success is greater.

Soil bioengineering not only complements the landscapes and the natural beauty of the country, but it also supports the government’s policy of environmental protection and nature conservation. Rehabilitating failed slopes with the Miyawaki method is nothing less than recre-

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*Figure 1.6. Plantings Developing on the Trial Plot in Bhutan, March 2004 to May 2006*

Source: Author’s photographs.
**Figure 1.7.** Roadside Slope Stabilization Using the Miyawaki Method of Reforestation, Japan

Gabion box wall constructed along Enna Road effectively controls slope failure and, by its design, promotes vegetation growth.

Ten-year-old restoration using the Miyawaki method. The slope has been stabilized with mixed species and dense planting.

Campus of Yokohama National University where the Miyawaki method of planting has been very successful.

Source: Author’s photographs.
ating natural forests, and it offers greater advantages than monoculture planting that has a higher risk of future erosion and disease.

The experimental plot I studied demonstrated that site recovery and land stabilization are much quicker with soil bioengineering. A year after its failure, the unrestored site remained bare and fragile; but a year after its rehabilitation, the slope has stabilized. Natural species have encroached to complement the saplings planted manually.

The role of vegetation and small-scale engineering works may be questionable in the face of larger landmass movement. For deep failures and major landslides, soil bioengineering is inadequate for slope stabilization. But much of Bhutan’s roadside instability begins small, is shallow, and spreads only if nothing is done to shore it up. Routine maintenance of roadside slopes using indigenous plantings will control surface erosion. Indigenous species adapted to local climate and soil conditions are the best options from all points of view, including cost effectiveness.

In view of the number of kilometers added each year to the existing road network, it is clear that the most viable solution is to take advantage of the rich ecological resources available to repair the slope damage caused by landslides and to recreate natural ecosystems through plantings.

One of the key goals of my study was to find a means of ensuring higher rates of success for roadside bioengineering. I found that linking soil bioengineering with a study of phytosociology based on the Braun-Blanquet approach and the Miyawaki method of reforestation is a promising option. My study of the plant communities on eight plots along the roads in western Bhutan enabled me to understand the characteristics, relationships, and distribution of plant communities. That is critical information for anyone preparing a recovery plan for failed or degraded sites because greater success is likely when species that occur in the adjacent or neighboring forests are used to rehabilitate the slopes.

A wider application of the Miyawaki reforestation method not only will result in economic savings but also will enhance roadside aesthetics more than can the traditional geotechnical approaches. Successful soil bioengineering efforts will produce much more stable roadside slopes and reduce slope failures. It will lower the cost of monsoon restoration, and there will be general reduction in the cost of road maintenance.

To realize the full advantages of soil bioengineering, it is necessary to apply it on a much wider scale in Bhutan. Wider application demands that the methodology be incorporated as one of the country’s routine maintenance activities. To promote its being formally introduced in day-to-day road maintenance, I recommend the following actions:

- Develop individual maintenance plans for each road, based on the local characteristics—climate, soil, altitude, and so forth.
- Establish a schedule for routine road maintenance that is based on actual surveyed needs.
- Develop within the Department of Roads a body of knowledge about vegetation science to ensure careful selection of woody plants for reforestation. Recovering a site in a way that mimics the neighboring natural forest will reduce the need for road maintenance and repair.
- Train the workforce in the skills needed for soil bioengineering.
- Adapt the Miyawaki method to suit Bhutanese circumstances.
- Use wild saplings from neighboring forests when potted seedlings are not available. Take advantage of the rich biotic resources available in Bhutan.
- Train the road workforce to develop and maintain seedlings. This will provide needed plant materials and enhance the workers’ capabilities.
- Train local people and organizations to grow seedlings from nearby plants. This is particularly suitable for maintaining local or individual access roads.
References


Bernice Serwah Duodu

The study examines the long-run effects of fiscal deficits on output growth in Ghana for the period 1970 to 2000. It adopted a growth accounting model with slight modifications. A dummy variable to capture the political environment of the economy is included. Standard economic theory requires the variables to be stationary, so the econometric methodology first examines the stationarity of the variables using the augmented Dickey-Fuller (p) test. A time-series analysis is conducted with particular attention paid to the causal relationship between deficits and growth in the context of the Granger causality test. The results provide evidence that there is a relationship between deficits and output growth. Regression analysis of the data reveals that deficits impede economic growth in Ghana. Specifically, an increase of 1 percent in deficit will result in a 12 percent decline in the growth of gross domestic product. The empirical results, based on the long-run deficit–growth model, also reveal that changes in deficits, inflation, and the nature of the political environment have negative effects on growth, whereas exports, the level of money stock, foreign direct investment, and private investment have positive effects. Recommendations resulting from this study include policy consistency between fiscal deficits and other macroeconomic targets, and the shifting of government reliance on donor inflows to dependence on internal resources. This shift should be accomplished by strengthening the ability of Ghana’s revenue mobilization agencies to increase revenues by widening the tax base rather than by increasing the tax rate.

Recent decades have witnessed intense debate on the effectiveness of fiscal policy in stimulating economic growth. The main focus has been on whether government activity promotes or retards economic growth. According to neoclassical growth theory, fiscal policy does not affect the steady-state growth rate. In contrast, new growth theories allow an important role for fiscal policy in the growth process.

Conceptually, we can think of fiscal deficits as a measure of the extent to which a government is spending beyond its means. In precise mathematical terms, the fiscal deficits are the difference between the total expenditure of the government and the sum of its “revenue receipts” and those “capital receipts” that do not create any future payment obligations.

Macroeconomic instability in Ghana has been fueled to a large extent by government policies that have resulted in a persistent overshooting of the expected budget deficits, and by the meas-

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ures used to finance the growing deficits. Key factors that have accounted for the government’s tendency to exceed expected deficits include weak revenue mobilization mechanisms and anticipatory spending (that is, spending in anticipation of donor inflows)—especially debt monetization and the sale of treasury bills.

Among the principal objectives of Ghana’s fiscal policy are to stabilize and reduce domestic debt with a view to stemming the increase in interest payments and to achieve the desired easing in real interest rates. Thus, fiscal policy management is geared toward reducing fiscal deficits and, consequently, government borrowing. The main element of the strategy to achieve the fiscal policy objectives is improved resource mobilization. Strategies adopted to improve fiscal resource mobilization include minimizing revenue leaks in all revenue collection agencies (the Internal Revenue Service, the Customs and Preventive Service, and the value added tax); reviewing and revising existing taxes by instituting measures that widen the tax base; establishing fees and user charges; strengthening the revenue collection institutions; and strengthening the district assemblies for improved tax collection. Huge budget deficits and associated inflation hikes can heighten uncertainty about government policies, and thus may increase the risk premium in Ghana, resulting in domestic and foreign investors not having confidence in the country’s economy. Such large fiscal deficits also can lead to an explosion in domestic debt that can crowd out credit to the private sector, further constraining firms’ financing options.

Financing the deficit by issuing high-yield treasury bills has inverted the yield curve on government securities (ECA 2003) that always has been negative (and only changed in 2002), giving more rewards to investors in short-dated securities than to those in long-term securities. As a result, many potential investors prefer to hold short-term instruments, and that restricts private firms’ abilities to raise long-term capital. This means of deficit financing also has shifted resources from the securities market to the government bill market, leaving the securities market thin and less liquid. For instance, between 1995 and 2002, private investments averaged only 4.1 percent of gross domestic product (GDP), despite the recent improvements in fiscal discipline. Because of high deficits at the central government level and high losses in state-owned enterprises, the ratio of public sector debt to GDP stood at 159.0 percent in 2002—twice as high as in Senegal (78.8 percent). Ghana’s fiscal performance currently compares unfavorably with that of its peers because of weaknesses in expenditure management and heavy reliance on volatile foreign grants. As a result of these fiscal weaknesses, combined with external vulnerabilities, Ghana experienced large currency depreciations, high levels of inflation, and interest rate increases between the late 1970s and 2000. Average inflation, which stood at an expected 26.9 percent in 2003, is much higher in Ghana than in other B-rated countries—such as Senegal (2.3 percent), which is a member of the West African Economic and Monetary Union.

In 2001, the government acted to reduce deficits and debt by introducing new taxes and curtailing expenditures, but it could not prevent a further accumulation of domestic arrears and recourse to domestic financing. The 2002 budget output did not reduce the government’s recourse to domestic financing because of unbudgeted increases in the wages of health and education staffs, inadequate control of wage expenditure in some ministries, new shortfalls in official assistance, and higher-than-budgeted utility subsidies. These factors have raised certain issues, and this study seeks to address the following questions:

1. What has been the trend in Ghana’s fiscal deficits over the period from 1970 to 2000?
2. What has been the trend in that country’s economic growth over the same period?
3. What has been the relationship between fiscal deficits and economic growth from 1970 to 2000?

Study Objectives

The main objective of this study is to examine the effect of fiscal deficits on output growth in Ghana from 1970 to 2000. Specifically, the study seeks to
• Define the causal relationship between output growth and fiscal deficits, if one exists
• Identify the trends in fiscal deficits over the period 1970 to 2000
• Identify the trends in economic growth over the same period
• Make policy recommendations based on the study findings.

**Importance of the Study**

The effect of fiscal deficits on growth in Ghana is quite significant for policy decisions, especially in achieving the goals of the Ghana Poverty Reduction Strategy so that the economy will be managed effectively to enable wealth creation for the benefit of all Ghanaians. Fiscal deficits contribute to a low level of national saving, which then reduces domestic investment and increases borrowing from abroad. Reduced national saving raises domestic interest rates, which crowds out private investments, reduces the rate of employment, and attracts capital from abroad. The external borrowing that helps finance budget deficits is reflected in a larger current account deficit, thus creating a link between the budget deficit and the current account deficit.

Given that Ghana’s government engaged in an ambitious fiscal consolidation program that was expected to lead in 2004 to a central government deficit reduction to 2.4 percent, the overall budget deficit was 3.2 percent of GDP, compared with the targeted 1.7 percent of GDP. Therefore, estimating fiscal deficit and growth has more than academic motivation. The estimation results can help government tax revenue collection agencies forecast revenue needed to match government expenditures over a particular period and so have a balanced budget.

This study hopes to bring to light a basis for formulating policies that provides certainty in budget projections. Such projections would enhance confidence in the country’s macroeconomic environment and promote private sector–led growth to sustain the expansion of output and employment. It is the government’s plan to create an enabling environment in which the private sector can grow, and the results of this study will provide vital input for economic growth modeling of the Ghanaian economy.

Furthermore, knowing the signs of relevant variables in the deficit–growth model can help policy makers formulate policies that will accelerate growth and alleviate poverty. The analysis should stimulate debate between policy makers who wish to change policies and those who wish to maintain them.

Finally, there is very little literature on the relationship between fiscal deficits and growth in Ghana, so this study intends to add to the relevant body of knowledge.

**Review of the Literature**

Chronic government fiscal deficits and escalating government debt have become major concerns in both developed and developing countries, so the purpose of this portion of the study is to examine some of the major theoretical arguments and empirical studies on fiscal deficits and economic growth.

At a theoretical level, much of the literature focuses on the relationship between private investment and public expenditure, mainly because of the crowding-out effect of public spending (see, for example, Bailey 1971; Buiter 1977; Premchand 1984; Yellen 1989; and Barro 1990). Some of these studies, such as Premchand (1984), asserted that financing the budget deficit by borrowing from the public implies an increase in the supply of government bonds. To improve the

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2. The increase in interest rates also may exert a negative influence on aggregate demand through several channels. First, the increase in interest rates reduces investment, which is a component of aggregate demand. Second, the increase directly may reduce interest-sensitive consumption, such as on credit-financed durable goods. Third, rate increases indirectly may reduce consumption by reducing asset values and, therefore, household net wealth.

3. Most of the literature is drawn from Saleh (2003).
attractiveness of these bonds, the government offers them at a lower price, which leads to higher interest rates. The increase in interest rates discourages issuance of private bonds, private investment, and private spending. In turn, this contributes to the financial crowding out of the private sector.

Other literature addressing fiscal deficits’ effects on growth focuses on the relationship between deficits and inflation. For example, Metzler (1951), Patinkin (1965), Friedman (1968), Sargent and Wallace (1981), Dwyer (1982), and Miller (1983) argued that government deficit spending is a primary cause of inflation. Some of those studies (such as that of Sargent and Wallace) have supported the proposition that the Central Bank will be obliged to monetize the deficit either now or in later periods. Such monetization results in an increase in the money supply and in the rate of inflation, at least in the long-term period.

Miller (1983) argued that government deficits necessarily are inflationary, irrespective of whether the deficits are monetized. According to Miller, deficit policy leads to inflation through different channels. For instance, even if the Central Bank does not monetize the deficit, deficits produce inflation through crowding out. That is, nonmonetized deficits lead to higher interest rates; higher interest rates crowd out private investment and hence reduce the rate of growth of real output. Higher interest rates also spur the financial sector to innovate in the payment system and make government bonds more substitutable for money.

Barro (1978; 1979) has suggested that deficits are a result of inflation, rather than a prompt for it. The government deficit is the change in the nominal value of outstanding government bonds. If the anticipated inflation increases, then the nominal value of bonds must increase to maintain the real value of outstanding bonds. In addition, the monetarists have argued that there is a positive link between government deficits and monetary growth, asserting that higher bond-financed deficits will put upward pressure on interest rates and on government bonds. Because the Central Bank is concerned with smoothing interest rate movements, it would then tend to increase the money supply (Darrat 1985).

In addition, other studies focus on the relationship between the fiscal deficit and the trade deficit (“twin-deficits relationship”). The twin-deficit hypothesis asserts that an increase in the fiscal deficit will cause a similar increase in the current account deficit. As part of an extensive body of literature on the topic, Fleming (1962), Mundell (1963), Volcker (1987), Kearney and Monadjemi (1990), and Smyth and Hsing (1995) have argued that government deficits might cause trade deficits through different channels. For example, in a Mundell-Fleming framework, it is argued that an increase in the budget deficit would induce upward pressure on interest rates, causing capital inflows and an appreciation of the exchange rate that will increase the current account deficit. The Keynesian absorption theory suggests that an increase in the fiscal deficit would induce domestic absorption and, thus, import expansion, causing a current account deficit.

Volcker (1987) argued that budget deficits lead to trade deficits and that both hinder economic growth in the long run. Fieleke (1987) provided the theoretical basis for the relationship between the budget deficit and the trade deficit. He argued that the dominant theory is that an increase in government borrowing in a country will, other things being equal, put upward pressure on interest rates (adjusted for expected inflation) in that country, thereby attracting foreign investment. As foreign investors acquire the country’s currency in order to invest there, they bid up the price of that currency in the foreign exchange market. The higher price of the country’s currency will discourage foreigners from purchasing its goods but will conversely encourage residents of the country to use their now more valuable currency to purchase foreign goods, so that the country’s current account will move toward a deficit (or toward a larger deficit). In addition, any increase in the country’s total spending resulting from the enlarged government deficit will go partly for imports and for domestic goods that would otherwise be exported, also worsening the current account balance (pp. 173–74).
Moreover, other literature has concentrated on the relationship between the fiscal deficit and the exchange rate (for example, Allen [1977], Bisignano and Hoover [1982], Penati [1983], Branson [1985], Hakkio [1996], and Stoker [1999]). Some of these studies, such as that by Bisignano and Hoover, argued that deficits may appreciate or depreciate the exchange rate, depending on the relative importance of the wealth effect and relative asset substitution effects.

Hakkio (1996) provided a summary of the indirect effects of a deficit on the exchange rate. He argued that a deficit reduction can cause a higher demand for loanable funds through three major channels: lower expected inflation, lower foreign exchange risk, and a greater expected rate of return on domestic assets because of lower inflation. Large or out-of-control budget deficits that are financed by printing money lead to higher inflationary expectations (Hakkio 1996).

Even if the debt is not monetized, its large size could convince the markets that it eventually will be paid through an inflation tax. A credible attempt to control the deficit lowers inflationary expectations and the inflation premium on long-term interest rates. According to the Fisher effect, nominal long-term interest rates could decline by the same percentage, and real rates would remain the same. If nominal long-term interest rates do not fall as much as the expected inflation premium has declined, however, real long-term rates would increase. Thus, a deficit reduction makes domestic assets more attractive and causes the currency to appreciate. Furthermore, the overall effect of a deficit reduction on the exchange rate is dependent on whether the deficit reduction is credible, long-term, and sustainable.

Overview of Trends in Fiscal Deficits and Growth

To examine the fiscal deficit–growth relationship in Ghana, we need to examine trends in fiscal deficits and economic growth. This portion of my study offers some insights into the records of these two variables.

Trends in Fiscal Deficits

Fiscal deficit is the excess of expenditure over revenue plus interest payments on domestic and foreign debt. Since the early 1960s when overindulgence in modernization and import substitution led to excessive government spending, the public budget in Ghana (even if narrowly defined) registered deficits until 1986 (figure 2.1). Between 1965 and 1985, the narrowly defined deficit averaged about 5 percent of GDP annually. To finance the deficit, government relied mostly on internal borrowing from the banks and from the nonbank public. Before the time of the Economic Recovery Program (ERP), reliance on external borrowing to finance Ghana’s fiscal deficit was negligible. Kwame Nkrumah’s pride of place as the champion in the fight against neocolonialism prevented his government from seeking budgetary support from the Bretton Woods institutions, whose activities he viewed as imperialist. During the governments of the National Liberation Council (1966–69) and the Progress Party (1969–72), an adjustment program sponsored by the International Monetary Fund (IMF) opened the door to external borrowing to finance the deficit. In 1970, the deficit was almost fully financed from external borrowing.

The trend toward external borrowing to finance the deficit turned in 1972, when Ignatius Acheampong’s National Redemption Council took power from the Progress Party government and repudiated some of Ghana’s external debts. Ghana was then blacklisted in the international financial community. From 1973 to 1979, and even running through the years of the Armed Forces Revolutionary Council to the People’s National Party and into the early years of the Provisional National Defence Council (1979–83), Ghana could raise very little external finance to support its deficit. Over these years, government borrowed heavily from the banking sector to finance the deficit.

4. This section draws on Sowa (1994).
Fiscal performance in the ERP period (1983 onward) has been quite different from the performances of past regimes. Somehow, government expenditure has been restrained in both real and nominal terms. Several “cost-saving” and “cost-recovery” measures have been introduced in most public departments and services. Subsidies on health and education have been removed. Hospital fees have been introduced at government hospitals, and parents now are required to pay more for the education of their wards. Government expenditure has consistently been kept at 14 percent of GDP. As part of the measures to maintain the restraint on expenditure, the public sector wage bill has been pegged at 5 percent of GDP, forcing government to retrench public employees. On the revenue-producing side, efforts at tax collection have been intensified, and the tax net has been widened. Restrained government spending and enhanced revenue collection have eliminated the deficit (narrowly defined) since 1986.

It is interesting to note the importance of foreign inflows to the Ghana budget in the ERP era. The international credibility that Ghana gained in its economic turnaround under the ERP has translated into external capital inflow that has supported the budget and the balance of payments. Since 1986, external support also has helped pay off some internal public debt.

**Trends in Economic Growth**

Trends in Economic Growth

There always has been the view that the economy of Ghana could and should grow faster than it has (see Aryeetey and Fosu 2005). The nation’s recent growth record is deemed inadequate for achieving the Millennium Development Goals by the year 2015. In 1993, Ghana set itself the target of becoming an upper-middle-income country by 2020 under its Vision 2020 program. To achieve the targeted per capita income by that year, it was reckoned that the economy needed to grow at an annual average of 8 percent. However, the economy has not shown a capacity to move toward the target. The performance of the economy and the economic growth have been characterized by not attaining macroeconomic goals. In particular, whereas the GDP was expected to grow between 7.1 percent and 8.3 percent in the period 1996–2000, actual growth was between 4.2 percent and 5.0 percent. The significant deviation between targets and the actual performance translated into low per capita GDP growth and poor sectoral growth.

Ghana’s growth record has been one of unevenness when we compare the postreform period with the earlier period, as figure 2.2 clearly indicates. After a reasonably strong GDP growth in the 1950s and early 1960s, the Ghanaian economy began to experience a slowdown in GDP growth in
1964. Growth was turbulent during much of the period after the mid-1960s and began to stabilize only after 1984. In 1966, 1972, 1975–76, 1979, and 1980–83, the growth rate was negative. It is interesting that the years in which negative growth was experienced generally coincided with changes in government and sometimes with policy changes or reversals. Indeed, negative growth was first recorded at the time of the first coup d’état in 1966, with a forceful transfer of authority from the dictatorial Nkrumah regime to the military. The lowest growth (–14 percent) occurred in 1975, coinciding with oil price shocks and a policy reversal from a moderately market-oriented stance to an inward-looking protectionist regime. The period of turbulence, however, also had positive growth episodes, with the peak rate reaching 9 percent in 1970 and 1978.

DEVELOPMENTS FROM 1960 TO 1965. This period was characterized by the preparation and implementation of a Seven-Year Development Plan: 1963/64–1969/70, under the Nkrumah regime, in which bold efforts were made to modernize the economy through industrialization. Therefore, it is not surprising to see that physical capital accumulation over this period was the most significant contributor to output growth. At the macroeconomic level, however, the economy was in decline. This decline reflected a deteriorating balance of payments position and the poor credit rating accorded the country as it struggled to expand its economy rapidly. The country registered three consecutive years of negative growth in per capita GDP between 1964 and 1966, and inflation increased from 1.0 percent in 1957 to 22.7 percent in 1965.

DEVELOPMENTS FROM 1966 TO 1971. The deteriorating economic situation and the fall in living standards were given as the reasons why a group of army and police officers overthrew the Nkrumah government in February 1966. In 1969, the military regime handed over power to the civilian government of Dr. K. A. Busia. The government introduced IMF-sponsored monetary reforms, devalued the currency, and liberalized the external sector (Frimpong-Ansah 1991). Under the military, disinflation policies aimed at stabilizing the macroeconomy were implemented. There was a reduction in domestic investment, tighter control over import licenses, and a devaluation of the cedi (Killick 1978). The objective of stabilization was largely achieved. GDP growth increased from –0.2 percent in 1967 to 1.2 percent by 1969.

DEVELOPMENTS FROM 1972 TO 1983. As observed earlier, the 1970s and early 1980s saw the most significant decline in per capita GDP growth, with the decline in total factor productivity being the most significant contributory factor. This was not surprising because the period was one of sustained deterioration in the economy under five “different” governments, and it has been described aptly by Aryeetey and Tarp (2000) as one of “muddling through.” Under the different

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**Figure 2.2. Trends in Growth Rates, 1970–2003**

**Percent of GDP, series 1**

![Graph showing trends in growth rates from 1970 to 2003](image-url)

*Source:* Author’s calculations computed from *International Financial Statistics* (various issues), *Ghana Statistical Service Quarterly Digest* (various issues), and *World Development Indicators* 2003.

*Note:* GDP = gross domestic product.
governments—mostly military—the policies of the period emphasized import substitution, underpinned by a restrictive foreign exchange regime, quantitative restrictions on imports, and price controls, with the state playing a major role as producer. The dramatic contraction between 1970 and 1983 entailed declines in per capita GDP of more than 3.0 percent a year, in industrial output by 4.2 percent a year, and in agricultural output by 0.2 percent a year (Tabatabai 1986).

Successive governments responded with import controls, which fell disproportionately on consumer goods. Consumer goods as a proportion of imports fell from 20.2 percent in 1975 to 17.1 percent in 1980. Once again, the continuing economic decline was the pretext under which Flt. Lt. Jerry John Rawlings staged a coup d’etat in December 1981, establishing the Provisional National Defence Council.

DEVELOPMENTS FROM 1984 TO 2000. The Structural Adjustment Program was one for the economic liberalization of various sectors of the economy. Exchange rate policy, fiscal and monetary policies, privatization, and trade policies all saw dramatic changes with increased liberalization of the economy. The growth trends (shown in figure 2.2) suggest clearly that there has been a marked contrast in the growth performance of the Ghanaian economy since the reforms. Obviously, this is different from the question of whether this growth is enough. Indeed, since 1983, annual GDP growth rates have averaged 5 percent, with the output of cocoa, minerals, and timber increasing significantly. And inflation fell from the very high prereform levels (122 percent in 1983) to 10 percent in 1992.

Furthermore, the fiscal condition of the economy reverted to its earlier ill health in the 1990s. It registered a deficit of 11 percent of GDP (government deficits, excluding grants), nearly parallel to the 12 percent rate for the control period of 1975–84, and slightly more than twice the ratio during the earlier phase of the reform era. Much of this worsening in the government budget deficit could be attributed to substantial increases in government expenditures, which, as a percent of GDP, increased by 9.0 percent over the previous period, compared with an increase in government revenues of only about 3.0 percent.

Model Specification, Estimation, and Empirical Results

In this section we’ll consider the empirical model used in estimating the effects of fiscal deficit on growth in Ghana.

Model Specification and Formulation

For this study I adapted the growth accounting model of Lin (1994), with slight modifications resulting from the lack of data. Kweka and Morrissey (1999) adapted the same model for their study to investigate the impact of public expenditure on economic growth in Tanzania. According to those investigators, output ($Y$) is assumed to be a function of productive inputs, capital ($K$) and labor ($L$). The two sectors, government ($g$) and private ($p$), possess each of the two factors of production. In such a setting, output is a function of the two factors of production and government expenditure ($G$). The assumption is that government services affect the efficiency of productive units of capital and labor, either positively or negatively. In the context of developing countries, exports ($X$) and foreign capital ($F$) are potential determinants of growth and can be included. Additionally, change in capital can be expressed as investment ($I$). Government expenditure can be decomposed into productive ($I_g$) and unproductive ($C_g$) components, with $I_p$ as private investment ($I = I_g + I_p$). Mathematically,

$$Y = a_1 I_p^{\alpha_1} L^{\alpha_2} I_g^{\alpha_3} C_g^{\alpha_4} X^{\alpha_5} F^{\alpha_6},$$

(2.1)

where $\alpha_1$ through $\alpha_6$ are elasticities. With no suitable time-series measure of labor, they assumed that labor inputs can be proxied by government expenditure on human capital. There-
fore, with $\varepsilon$ = the error term, the base regression (with variables expressed in natural logarithms) is as follows:

$$\ln Y = \ln a + a_1 \ln Ip + a_2 \ln Ig + a_3 \ln Cg + a_4 \ln X + a_5 \ln L + a_6 \ln F + \varepsilon. \quad (2.2)$$

Because the objective of the study is to investigate the effects of fiscal deficits on growth, deficit becomes an important explanatory variable of interest and was thus included. Foreign capital is a component of foreign direct investment, so I proxied foreign capital with foreign direct investment to look at the totality of foreign inflows to the country, in the form of either capital or technology. Also, most growth models include other macroeconomic variables that have an effect on growth, so this study included inflation and the level of money stock as part of the explanatory variables because they have the tendency to distort economic stabilization.

A dummy variable to capture the political environment of the economy also was included: $D = 1$ for a democratic era and $D = 0$ for a military regime.

Finally, the model to be used for the regression analysis is specified as

$$\ln RGDP = \ln a + \alpha_1 \ln PVTINV + \alpha_2 \ln MGRO + \alpha_3 \ln DEFT + \alpha_4 \ln EXPT + \alpha_5 \ln FDI + \ln INFL + PDUM + \varepsilon. \quad (2.3)$$

The regression variables are defined in Table 2.1.

**Test of Hypotheses**

To achieve the stated objectives, the following hypotheses were tested:

- $H_0$: fiscal deficits exert no effect on economic growth in Ghana ($H_0$: $\alpha_3 = 0$).
- $H_1$: fiscal deficits exert an effect on economic growth in Ghana ($H_1$: $\alpha_3 \neq 0$).

The null hypothesis ($H_0$) states that fiscal deficits have no effect on economic growth. That is, the variable cannot explain the variation in growth, and fiscal deficits are not significantly different from zero. The alternative hypothesis ($H_1$) implies that a fiscal deficit is significantly different from zero. In other words, the explanatory variables have an effect on explaining the changes in economic growth in Ghana.

**Data Sources**

The study relies heavily on secondary (time-series) data obtained from various publications of the Ghana Statistical Service and on information gathered from world tables published by Johns Hopkins University, the International Monetary Fund’s *International Financial Statistics Yearbook* (various issues), the World Bank’s *World Development Indicators 2003*, and various Internet sites.

Annual data for the period 1970–2000 are used to estimate the model specified. These data are presented in the annex to this chapter (Table 2A.1).

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**Table 2.1. Definitions of the Variables Used**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>$C$</td>
<td>Constant</td>
</tr>
<tr>
<td>$DEFT$</td>
<td>Fiscal (budget) deficit (% of GDP)</td>
</tr>
<tr>
<td>$\varepsilon$</td>
<td>Error term</td>
</tr>
<tr>
<td>$EXPT$</td>
<td>Exports of goods and services (% of GDP)</td>
</tr>
<tr>
<td>$FDI$</td>
<td>Foreign direct investment (% of GDP)</td>
</tr>
<tr>
<td>$INFL$</td>
<td>Inflation, consumer price index (annual %)</td>
</tr>
<tr>
<td>$MGRO$</td>
<td>Growth rate in money stock (annual %)</td>
</tr>
<tr>
<td>$PDUM$</td>
<td>Dummy variable for political environment</td>
</tr>
<tr>
<td>$PVTINV$</td>
<td>Private investment (% of GDP)</td>
</tr>
<tr>
<td>$RGDP$</td>
<td>Growth rate of real GDP</td>
</tr>
</tbody>
</table>

*Source: Author.*

*Note: GDP = gross domestic product.*
**Table 2.2. Unit Root Tests for the Variables of the Deficit–Growth Relationship (Sample 1970–2000)**

<table>
<thead>
<tr>
<th>Variable</th>
<th>ADF statistic</th>
<th>Critical values</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\epsilon$</td>
<td>-4.357489 (0.0003)</td>
<td>1% = -2.6649, 5% = -1.9559, 10% = -1.6231</td>
<td>Stationary</td>
</tr>
<tr>
<td>INF Inflation</td>
<td>-4.074671 (0.0004)</td>
<td>5% = -3.5670, 10% = -3.2169</td>
<td>Stationary</td>
</tr>
<tr>
<td>LDEFT</td>
<td>-1.722237 (0.0965)</td>
<td>1% = -4.2949, 5% = -3.5670, 10% = -3.2169</td>
<td>Nonstationary</td>
</tr>
<tr>
<td>LEXPT</td>
<td>-1.378006 (0.1795)</td>
<td>1% = -4.2949, 5% = -3.5670, 10% = -3.2169</td>
<td>Nonstationary</td>
</tr>
<tr>
<td>LFDI</td>
<td>-4.218084 (0.0002)</td>
<td>5% = -3.5670, 10% = -3.2169</td>
<td>Stationary</td>
</tr>
<tr>
<td>LMGRO</td>
<td>-4.788749 (0.0001)</td>
<td>1% = -4.2949, 5% = -3.5670, 10% = -3.2169</td>
<td>Stationary</td>
</tr>
<tr>
<td>LKVPTINV</td>
<td>-3.927563 (0.0005)</td>
<td>5% = -3.5670, 10% = -3.2169</td>
<td>Stationary</td>
</tr>
<tr>
<td>LRGDP</td>
<td>-4.694163 (0.0001)</td>
<td>1% = -4.2949, 5% = -3.5670, 10% = -3.2169</td>
<td>Stationary</td>
</tr>
</tbody>
</table>

**Source:** Author’s calculations.

**Note:** ADF = augmented Dickey-Fuller test. See table 2.1 for definitions of variables. Probability values appear in parentheses.

**Table 2.3. Unit Root Test of First Difference of the Variables**

<table>
<thead>
<tr>
<th>Variable</th>
<th>ADF statistic</th>
<th>Critical values</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>DLDEFT</td>
<td>-7.530715 (0.0000)</td>
<td>1% = -4.3382, 5% = -3.5867, 10% = -3.2279</td>
<td>Stationary</td>
</tr>
<tr>
<td>DLEXPT</td>
<td>-11.12062, (0.0000)</td>
<td>1% = -4.3382, 5% = -3.5867, 10% = -3.2279</td>
<td>Stationary</td>
</tr>
</tbody>
</table>

**Source:** Author’s calculations.

**Note:** ADF = augmented Dickey-Fuller test. See table 2.1 for definitions of variables.

**Estimation Procedures**

**Test for Stationarity.** As a preliminary analysis, data are checked for stationarity. If the series are nonstationary, using standard econometric techniques can point to misleading results, so standard economic theory requires the variables to be stationary. However, a group series test was conducted to find the extent of correlation among the variables (see table 2A.2).

The econometric methodology first examines stationarity using the augmented Dickey-Fuller, or ADF, ($p$) test (Dickey and Fuller 1979; 1981). The test, applied to each individual series, consists of running the variables at their levels, first difference of series with the series lagged once, and with the option of intercept and trend.

First, I report the characteristics of the data by showing the unit root test results of the individual variables in the model (table 2.2). The table gives the $t$-statistic and the probability values. The $L(.)$ and $DL(.)$ are the log levels and the first difference, respectively, with $(.)$ representing the variables. I performed the tests using EViews 3.1 statistical software to compute both ADF statistics and their critical values.

As table 2.2 indicates, $LRGDP$, $LKVPTINV$, $LMGRO$, $INF$, and $LFDI$ were stationary at their levels and were significant because their critical values were less than the ADF statistics at the 1 percent, 5 percent, and 10 percent levels of significance. The retained residual of the equation also was stationary at the 1 percent, 5 percent, and 10 percent significance levels. The results included their graphs (see figure 2A.2).

The results presented in table 2.2 show that not all the variables were stationary at the levels. This is because the ADF statistics were less than their critical values, and thus we accept the null hypothesis that the variables are not significantly different from zero. However, they were stationary at the first difference, as presented in table 2.3. (Figure 2A.3 in the annex presents the graphs of the unit root test at their first difference.) In table 2.3, the ADF statistics are reported with the probability values in parentheses. The results show that the first difference of the variables being tested was stationary at the 1 percent, 5 percent, and 10 percent levels of significance. The results also suggest that GDP depends on the change in the level of the variables’ sta-
tionarity at first difference. That is, GDP depends on the change in the level of deficit and, specifically, on the change in the level of exports in Ghana.

Combining the results of tables 2.2 and 2.3, I conclude that the variables $\text{LRGDP}$, $\text{LPVTINV}$, $\text{LMGRO}$, $\text{LFDI}$, and $\text{INFL}$ are integrated of order zero: $X_t \text{ I}(0)$, where $X_t$ is a vector of these variables, whereas $\text{DLDEFT}$ and $\text{DLEXPT}$ are integrated of order one: $X_t \text{ I}(1)$, where $X_t$ is a vector of the variables mentioned. This leads to a reasonable assumption that there is a relationship among the variables.

Granger Causality Test. A degree of correlation between two variables does not necessarily mean there is a causal relationship between them; it simply may be attributable to the common association of a third variable. Detecting causal relationships among a set of variables, however, is one of the objectives of empirical research, so I used the Granger causality test to search for causal relationships. The concept of causality in the Granger approach is based mainly on the assumption that the future cannot cause the past; rather, the past and present cause the future. The Granger (1969) approach to the question of whether deficit causes growth is to see how much of the current growth can be explained by past values of growth. Growth is said to be Granger-caused by deficit if deficit helps in the prediction of growth. To investigate the causality between GDP and deficit, I performed a simple Granger causality test, the outcome of which is shown in table 2.4.

Two lags of each variable were used and the test considered the reverse causation. Given the low $F$-statistics and high probability values reported for the null hypothesis, I reject the null hypothesis for the test. This result indicates that there is a causal relationship between fiscal deficit and output growth.

Test for Cointegration. Cointegration is the statistical implication of the existence of a long-run relationship between economic variables. The test stipulates that if variables are integrated of the same order, a linear combination of the variables will be integrated of that same order. The idea behind cointegration analysis is that, although macro variables may tend to trend up and down over time, groups of variables may drift together. If there is some tendency for some linear relationships to hold among a set of variables over long periods of time, then cointegration analysis helps us discover it. If the variables are integrated of different orders, however, there is some linear combination of the two series that is stationary. In other words, instead of being $I(1)$, the linear combination is $I(0)$.

I applied a unit root test to the retained residual ($ER$) to determine its stationarity, excluding trend and intercept. The ADF test revealed that the retained residual is stationary at its level (that is, of $I(0)$ series) and significant at the conventional 1 percent, 5 percent, and 10 percent levels of significance. This implies that output growth is cointegrated with the other variables, and that there exists a linear combination of the variables that is stationary. This finding leads to a conclusion that there are long-run equilibrium relationships among the variables.

<table>
<thead>
<tr>
<th>Null hypothesis</th>
<th>Obs</th>
<th>F-statistic</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\text{DDEFT}$ does not Granger-cause $\text{RGDP}$</td>
<td>28</td>
<td>0.34958</td>
<td>0.70866</td>
</tr>
<tr>
<td>$\text{RGDP}$ does not Granger-cause $\text{DDEFT}$</td>
<td>0.42986</td>
<td>0.65572</td>
<td></td>
</tr>
</tbody>
</table>

Source: Author’s calculations.

Note: obs = observations. See table 2.1 for definitions of variables.
The long-run equation to be estimated is

$$LRGDP = C + LPVTINV + LMGRO + LFDI + INFL + DLDEFT + DLEXPT + ER.$$  \hfill (2.4)

**Empirical Results**

The results of the overparameterized deficit–growth model are presented in table 2.5. In an attempt to work toward a more parsimonious equation, this study adopted a general-to-specific modeling approach in the estimation process. This process imposes lag structures of all the variables in the cointegrated equation (eq. 2.4). Moreover, this technique makes it possible to deal with irrelevant variables rather than omitting relevant ones (see Thomas 1993). Using the Akaike information criterion, the significance of the individual variable, and the adjusted $R^2$ as a guide, the estimated equation was reduced to a more parsimonious model (see table 2.6). The estimate shows that the coefficients of all the regressors (explanatory variables) have the expected signs.

The $R^2$ value of 0.944579 shows that all variations in output growth can be explained by the explanatory variables. In other words, about 94.44 percent of the changes in output growth can

---

Table 2.5. Overparameterized Deficit–Growth Model

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>SE</th>
<th>t-Statistic</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>0.740105</td>
<td>1.341178</td>
<td>0.551832</td>
<td>0.6010</td>
</tr>
<tr>
<td>DLDEFT</td>
<td>-0.119096</td>
<td>0.034606</td>
<td>-3.441535</td>
<td>0.0138</td>
</tr>
<tr>
<td>DLEXPT</td>
<td>0.053333</td>
<td>0.027498</td>
<td>1.939496</td>
<td>0.1005</td>
</tr>
<tr>
<td>INFL</td>
<td>-0.017440</td>
<td>0.005899</td>
<td>-2.956590</td>
<td>0.0254</td>
</tr>
<tr>
<td>LFDI</td>
<td>-0.076660</td>
<td>0.151861</td>
<td>-0.505801</td>
<td>0.6310</td>
</tr>
<tr>
<td>LFDI(-1)</td>
<td>0.001443</td>
<td>0.222783</td>
<td>0.06477</td>
<td>0.9950</td>
</tr>
<tr>
<td>LFDI(-2)</td>
<td>0.325065</td>
<td>0.149246</td>
<td>2.178051</td>
<td>0.0723</td>
</tr>
<tr>
<td>LMGRO</td>
<td>0.275562</td>
<td>0.158742</td>
<td>1.735909</td>
<td>0.1333</td>
</tr>
<tr>
<td>LMGRO(-1)</td>
<td>0.389093</td>
<td>0.182638</td>
<td>2.130404</td>
<td>0.0772</td>
</tr>
<tr>
<td>LMGRO(-2)</td>
<td>-0.246154</td>
<td>0.213027</td>
<td>-1.155050</td>
<td>0.2918</td>
</tr>
<tr>
<td>LPVTINV</td>
<td>-0.143016</td>
<td>0.410917</td>
<td>-0.348040</td>
<td>0.7397</td>
</tr>
<tr>
<td>LPVTINV(-1)</td>
<td>-0.040981</td>
<td>0.438916</td>
<td>-0.093368</td>
<td>0.9287</td>
</tr>
<tr>
<td>LPVTINV(-2)</td>
<td>0.393137</td>
<td>0.239242</td>
<td>1.643258</td>
<td>0.1514</td>
</tr>
<tr>
<td>PDUM</td>
<td>-0.673354</td>
<td>0.344247</td>
<td>-1.956021</td>
<td>0.0982</td>
</tr>
</tbody>
</table>

$R^2$  | 0.934215 | Mean dependent variable | 1.506946 |
Adjusted $R^2$ | 0.791680 | SD dependent variable | 0.557969 |
SE of regression | 0.254669 | AIC | 0.293222 |
Sum squared residual | 0.389137 | SIC | 0.995335 |
Log likelihood | 11.01678 | $F$-statistic | 6.554279 |
Durbin-Watson statistic | 2.601271 | Probability($F$-statistic) | 0.014919 |

*Source: Author’s calculations.*

*Note: AIC = Akaike information criterion; SD = standard deviation; SE = standard error; SIC = Schwarz information criterion. See table 2.1 for definitions of variables.*
be explained by the parameter. The high F-statistic (22.72513) illustrates that the parameters (explanatory variables) are jointly significant and that the explanatory variables are capable of explaining the variation in output growth, the dependent variable. Also, the Durbin-Watson statistic (2.0) indicates that there is no serial autocorrelation.

It is evident from the result that changes in deficit, the variable of interest, are significant at the 1 percent level, and the coefficient of the variable suggests a negative effect on growth. This implies that a 1 percent increase in deficits will result in a decline of approximately 1 percent in economic growth. The implication is that the more the government spends beyond its revenue or income, the more deficits will accumulate and must be financed. Financing the deficits by borrowing from the public leads to higher interest rates, and that discourages private investment and private spending. Reduced private investment and spending contribute to the financial crowding-out of the private sector and consequently exert a negative effect on growth. This evidence is consistent with Arora and Dua's (1993) results. Their study suggested that higher fiscal deficits crowd out domestic investment and increase trade deficits. This is also in line with the findings reported by Karras (1994), who concluded that deficits are negatively correlated with the rate of growth of real output, and that increased deficits do appear to retard investment.

The estimate also revealed a positive relationship between changes in exports and growth, and this is significant at the 5 percent level. This means that a 1 percent increase in exports will boost growth by 6 percent. This relationship is in line with results reported by Little, Scitovsky, and Scott (1970). They contended that by encouraging exports, including agricultural exports, a country would benefit from more efficient resource use, more equalized income distribution, and more employment in both the agriculture and industry sectors of the economy. That position also is in line with the findings of Emery (1967), who concluded that economic growth like-

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**Table 2.6. Preferred Deficit–Growth Model**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>SE</th>
<th>t-Statistic</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>0.373204</td>
<td>0.844839</td>
<td>0.441746</td>
<td>0.6665</td>
</tr>
<tr>
<td>DLDEFT</td>
<td>-0.116092</td>
<td>0.025895</td>
<td>-4.483184</td>
<td>0.0007</td>
</tr>
<tr>
<td>DLEXPT</td>
<td>0.056263</td>
<td>0.016667</td>
<td>3.375788</td>
<td>0.0055</td>
</tr>
<tr>
<td>INFL</td>
<td>-0.016590</td>
<td>0.002500</td>
<td>-6.619371</td>
<td>0.0000</td>
</tr>
<tr>
<td>LFDI(-2)</td>
<td>0.355396</td>
<td>0.061031</td>
<td>5.790456</td>
<td>0.0001</td>
</tr>
<tr>
<td>LMGRO</td>
<td>0.501065</td>
<td>0.122416</td>
<td>4.159368</td>
<td>0.0030</td>
</tr>
<tr>
<td>LMGRO(-1)</td>
<td>0.447602</td>
<td>0.128720</td>
<td>3.477333</td>
<td>0.0072</td>
</tr>
<tr>
<td>LMGRO(-2)</td>
<td>-0.273137</td>
<td>0.121134</td>
<td>-2.254838</td>
<td>0.0436</td>
</tr>
<tr>
<td>LPVTINV(-2)</td>
<td>0.384405</td>
<td>0.140709</td>
<td>2.731912</td>
<td>0.0182</td>
</tr>
<tr>
<td>PDUM</td>
<td>-0.987338</td>
<td>0.144183</td>
<td>-6.847811</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

R²: 0.944579 Mean dependent variable: 1.384591
Adjusted R²: 0.903014 SD dependent variable: 0.693906
SE of regression: 0.021600 AIC: 0.076807
Sum squared residual: 0.560392 SIC: 0.572735
Log likelihood: 9.155127 F-statistic: 22.72513
Durbin-Watson statistic: 2.057662 Probability (F-statistic): 0.000003

Source: Author’s calculations.
Note: AIC = Akaike information criterion; SD = standard deviation; SE = standard error; SIC = Schwarz information criterion. See table 2.1 for definitions of variables.
ly would follow export growth. Kravis (1970) also recognized the tendency toward more growth in countries that have been more successful exporters.

It is apparent from the estimation that the level of foreign direct investment in Ghana over the past two years had a positive relationship with growth and was significant at the 1 percent level; and that a 1 percent increase in foreign direct investment will lead to a 35 percent increase in growth. Moreover, the estimate implies that foreign direct investment in a current year does not have any effect on growth, but the investment of the past two years does have a positive effect on growth.

From the results we see that the coefficient on inflation rate suggests that a unit change in inflation is associated with a 2 percent drop in growth. Inflation is statistically significant at the 1 percent level. The results also indicate that inflation is negatively related to growth. This implies that higher rates of inflation, ensuing from the financing of government deficits through the printing of money by the Central Bank, produce a domino effect on monetary growth and significantly influence inflation. This is in line with the findings of Darrat (1985), who suggested that both monetary growth and government deficits significantly influence inflation. In addition, he concluded that government deficits bear a stronger and more reliable relationship to inflation than monetary growth. Also, Ahking and Miller (1985) concluded that government deficits appear to be inflationary.

The results of the present study also suggest that the level of money stock in the current year is positively related with growth, and that a 1 percent change in the level of money stock will result in a 30 percent increase in output growth. This is significant at the 5 percent level. Moreover, the level of money stock in the previous year is positively related with growth, and a 1 percent change in the level of money stock in the previous year will result in a 45 percent increase in output growth. Money stock in the previous two years, however, is negatively related to economic growth, and a 1 percent change in the level of money stock in the past two years will result in a 27 percent decrease in output growth.

The dummy variable PDUM, introduced to capture the political environment of the economy, was statistically significant at the 1 percent level and reported a negative relationship with growth over the period. This might result from so many years of the economy being under military regimes. A theoretical investigation suggests that in economies where political power changes frequently, each administration is likely to spend a lot when it is in power and thus leave a high public debt to its successor (Sachs and Larrain 1993).

A 1 percent increase in private investment in the past two years will boost output growth by 38 percent. The results also indicate that private investment in the previous two years has a positive effect on growth and is statistically significant at the 5 percent level. The results also show that private investment in a current year does not have any effect on growth, although private investment in the past two years does have a positive relationship to growth. Therefore, much more private investment would be needed to spark sustainable growth in output, income, and employment, but such growth cannot be achieved without an efficient financial sector to increase the mobility of credit resources to help the private sector survive and be competitive.

**Conclusions and Policy Recommendations**

The study attempted to highlight and examine the effects of fiscal deficits on output growth in Ghana for the period 1970 to 2000. It is evident that deficit impedes growth in Ghana. Furthermore, my review of the literature shows that deficits have a negative effect on growth. Results of the time-series analysis with particular attention paid to the causal relationship between deficits and growth in the context of the Granger causality test show that there is a relationship between deficits and output growth.

The empirical results, based on the long-run deficit–growth model, suggest that changes in deficits, inflation, and the nature of the political environment have negative effects on growth,
whereas exports, the level of money stock, foreign direct investment, and private investment have a positive impact on growth.

These findings have important policy implications. Understanding the direction of causality between the two variables (deficits and growth) is crucial to formulating effective policies. The basic idea is that there must be consistency between fiscal deficits and other macroeconomic targets. When budgets persistently are overspent, it is most important that the way in which the resulting deficits are financed (whether through internal or external borrowing or by monetizing) brings inflation under control.

The largest issue for every economy, including that of Ghana, is to reduce fiscal deficits. Reduction can be achieved either by raising revenues or by decreasing expenditures. But given Ghana’s large informal sector (with approximately 80.4 percent operating outside the tax net), the government must strengthen the ability of revenue mobilization agencies to increase revenues by widening the tax base rather than by increasing the tax rate.

Moreover, government reliance on donor inflows must be shifted to dependence on internal resources. This can happen by ensuring that expenditures keep pace with revenues. To achieve this, the government needs to monitor the commitments and cash transactions of ministries, departments, and agencies to ensure that expenditures are within the allocated expenditure ceilings.

The policy objective of foreign direct investment in such matters as local content, technological upgrading, and balance of payments stability activities remains important in many developing countries, including Ghana. Although foreign direct investment is crucial if there is to be any hope of achieving the Millennium Development Goals by the year 2015, there is also a need for increased attention to infrastructure, the quality of human capital, institutions, governance, the legal framework, communication and information technology, the tax system, and the efficiency of the banking system.

Because private investment plays a crucial role in the economic and social development of the national economy, it is incumbent on the government to create an environment that promotes the growth of private investment in the country. Therefore, with the government making efforts to develop an economic environment that will spur business growth, the provision of public goods and infrastructure, credit, social services and targeted intervention (such as export subsidies) would foster the growth of private investment.

Although the resulting growth of the private sector has had a positive effect in the Ghanaian economy, much more private investment is needed to spark sustainable growth in output, income, and employment. An adequate banking system is an essential component of a program to increase the mobility of resources. Without efficient banks, no business can operate, much less prosper and be competitive. Taxes should be simple, moderate in size, and moderately progressive; and they should fall more on fixed assets than on outcomes.
Annex

Table 2A.1. Data Used for the Regression Analysis

<table>
<thead>
<tr>
<th>Year</th>
<th>DEFT</th>
<th>EXPT</th>
<th>FDI</th>
<th>INFL</th>
<th>MGRO</th>
<th>PDUM</th>
<th>PVTINV</th>
<th>RGDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970</td>
<td>2.2</td>
<td>44.1</td>
<td>3.1</td>
<td>3.0</td>
<td>9.8</td>
<td>1</td>
<td>7.9</td>
<td>6.8</td>
</tr>
<tr>
<td>1971</td>
<td>3.5</td>
<td>39.2</td>
<td>1.3</td>
<td>9.6</td>
<td>11.2</td>
<td>1</td>
<td>7.5</td>
<td>5.6</td>
</tr>
<tr>
<td>1972</td>
<td>5.7</td>
<td>46.7</td>
<td>0.5</td>
<td>10.1</td>
<td>40.6</td>
<td>1</td>
<td>5.3</td>
<td>-2.5</td>
</tr>
<tr>
<td>1973</td>
<td>5.3</td>
<td>45.2</td>
<td>0.6</td>
<td>17.7</td>
<td>18.9</td>
<td>0</td>
<td>4.1</td>
<td>15.3</td>
</tr>
<tr>
<td>1974</td>
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<td>33.2</td>
<td>0.4</td>
<td>18.1</td>
<td>26.6</td>
<td>0</td>
<td>6.9</td>
<td>3.3</td>
</tr>
<tr>
<td>1975</td>
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<td>37.2</td>
<td>2.5</td>
<td>29.8</td>
<td>38.0</td>
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</tr>
<tr>
<td>1976</td>
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<td>40.4</td>
<td>-0.7</td>
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<td>-3.5</td>
</tr>
<tr>
<td>1977</td>
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<td>29.7</td>
<td>0.6</td>
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<td>60.0</td>
<td>0</td>
<td>4.6</td>
<td>2.3</td>
</tr>
<tr>
<td>1978</td>
<td>9.0</td>
<td>26.2</td>
<td>0.3</td>
<td>73.1</td>
<td>68.6</td>
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<td>3.3</td>
<td>8.5</td>
</tr>
<tr>
<td>1979</td>
<td>6.4</td>
<td>26.4</td>
<td>-0.1</td>
<td>54.4</td>
<td>15.8</td>
<td>1</td>
<td>4.7</td>
<td>-3.2</td>
</tr>
<tr>
<td>1980</td>
<td>4.2</td>
<td>22.7</td>
<td>0.4</td>
<td>50.1</td>
<td>33.7</td>
<td>1</td>
<td>4.2</td>
<td>0.6</td>
</tr>
<tr>
<td>1981</td>
<td>6.5</td>
<td>21.5</td>
<td>0.4</td>
<td>116.5</td>
<td>51.5</td>
<td>1</td>
<td>3</td>
<td>-1.8</td>
</tr>
<tr>
<td>1982</td>
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<td>26.6</td>
<td>0.4</td>
<td>22.3</td>
<td>23.3</td>
<td>0</td>
<td>2.6</td>
<td>-7.2</td>
</tr>
<tr>
<td>1983</td>
<td>2.7</td>
<td>15.1</td>
<td>0.1</td>
<td>122.9</td>
<td>40.3</td>
<td>0</td>
<td>3.0</td>
<td>0.7</td>
</tr>
<tr>
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<td>15.2</td>
<td>0.0</td>
<td>39.7</td>
<td>53.6</td>
<td>0</td>
<td>5.2</td>
<td>8.6</td>
</tr>
<tr>
<td>1985</td>
<td>2.2</td>
<td>17.7</td>
<td>0.1</td>
<td>10.3</td>
<td>46.2</td>
<td>0</td>
<td>7.3</td>
<td>5.1</td>
</tr>
<tr>
<td>1986</td>
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<td>18.8</td>
<td>0.1</td>
<td>24.6</td>
<td>47.9</td>
<td>0</td>
<td>7.1</td>
<td>5.2</td>
</tr>
<tr>
<td>1987</td>
<td>-0.5</td>
<td>19.7</td>
<td>0.1</td>
<td>39.8</td>
<td>53.3</td>
<td>0</td>
<td>6.7</td>
<td>4.8</td>
</tr>
<tr>
<td>1988</td>
<td>-0.4</td>
<td>19.7</td>
<td>0.1</td>
<td>31.4</td>
<td>46.3</td>
<td>0</td>
<td>7.1</td>
<td>6.3</td>
</tr>
<tr>
<td>1989</td>
<td>-0.7</td>
<td>21.0</td>
<td>0.3</td>
<td>25.2</td>
<td>54.7</td>
<td>0</td>
<td>8.5</td>
<td>5.1</td>
</tr>
<tr>
<td>1990</td>
<td>-0.2</td>
<td>21.6</td>
<td>0.3</td>
<td>37.3</td>
<td>13.3</td>
<td>0</td>
<td>7.5</td>
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<td>0.3</td>
<td>18.0</td>
<td>16.7</td>
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<td>22.2</td>
<td>0.4</td>
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<td>2.1</td>
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<td>1.7</td>
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<td>32.6</td>
<td>1</td>
<td>7.3</td>
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<tr>
<td>1997</td>
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<td>33.3</td>
<td>1.2</td>
<td>27.9</td>
<td>45.5</td>
<td>1</td>
<td>10.8</td>
<td>4.7</td>
</tr>
<tr>
<td>1998</td>
<td>6.1</td>
<td>35.2</td>
<td>0.7</td>
<td>14.6</td>
<td>26.1</td>
<td>1</td>
<td>10.9</td>
<td>4.7</td>
</tr>
<tr>
<td>1999</td>
<td>6.5</td>
<td>37.8</td>
<td>0.8</td>
<td>12.4</td>
<td>16.2</td>
<td>1</td>
<td>7.2</td>
<td>4.4</td>
</tr>
<tr>
<td>2000</td>
<td>8.1</td>
<td>35.6</td>
<td>2.2</td>
<td>25.2</td>
<td>38.4</td>
<td>1</td>
<td>7.5</td>
<td>3.7</td>
</tr>
</tbody>
</table>

Source: Author’s calculations based on International Financial Statistics (various issues), Ghana Statistical Service Quarterly Digest (various issues), and World Development Indicators.

Note: See table 2.1 for definitions of variables.

Table 2A.2. Correlation Matrix of the Variables

<table>
<thead>
<tr>
<th></th>
<th>DEFT</th>
<th>EXPT</th>
<th>FDI</th>
<th>INFL</th>
<th>MGRO</th>
<th>PDUM</th>
<th>PVTINV</th>
<th>RGDP</th>
</tr>
</thead>
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<tr>
<td>DEFT</td>
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<td>0.272964</td>
<td>0.046142</td>
<td>-0.441440</td>
<td>-0.373825</td>
<td></td>
</tr>
<tr>
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<td>1.000000</td>
<td>0.317168</td>
<td>-0.350892</td>
<td>-0.445642</td>
<td>0.095492</td>
<td>-0.064573</td>
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</tr>
<tr>
<td>FDI</td>
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<td>0.317168</td>
<td>1.000000</td>
<td>-0.250056</td>
<td>-0.168783</td>
<td>0.459118</td>
<td>-0.007958</td>
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<tr>
<td>INFL</td>
<td>0.272964</td>
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<td>-0.250056</td>
<td>1.000000</td>
<td>0.428885</td>
<td>-0.513574</td>
<td>-0.199548</td>
<td></td>
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<tr>
<td>MGRO</td>
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<td>0.428885</td>
<td>1.000000</td>
<td>-0.228988</td>
<td>0.027784</td>
<td></td>
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<tr>
<td>PVTINV</td>
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<td>0.095492</td>
<td>0.459118</td>
<td>-0.513574</td>
<td>-0.228988</td>
<td>1.000000</td>
<td>0.266472</td>
<td></td>
</tr>
<tr>
<td>RGDP</td>
<td>-0.373825</td>
<td>-0.064573</td>
<td>-0.007958</td>
<td>-0.199548</td>
<td>0.027784</td>
<td>0.266472</td>
<td>1.000000</td>
<td></td>
</tr>
</tbody>
</table>

Source: Author’s calculations.

Note: See table 2.1 for definitions of variables.
Figure 2A.1. Graphs of the Major Variables Used, 1970–2000

Source: Author's calculations, using Eviews 3.1.
Note: See table 2.1 for definitions of variables.
Figure 2A.2. Levels of the Variables Used, 1970–2000

Source: Author’s calculations, using Eviews 3.1.
Note: See table 2.1 for definitions of variables.
**References**


Determinants of Health Status in Kenya

Edward Muchiri Gakunju

Human health has a major role to play in an economy’s development. Healthy populations increase countries’ productivity. This has been demonstrated by industrial countries that now are benefiting from years of investment in health services. Kenya entered the 1970s with a strong macroeconomic base and a strong public health sector. As a result, health status improved tremendously, with infant and under-five mortality rates declining over the next 20 years. This good performance, however, was not sustained after the first two decades of independence, as infant and under-five mortality rose in the 1990s because of poor economic performance and poor services delivery in the health sector. The emergence of HIV/AIDS in the late 1980s and early 1990s contributed to the decline in the delivery of health services, as did the fact that public expenditure had long been the main source of funding to the health sector. This study was done to analyze the factors that determine health status, using secondary data collected from publications of Kenya’s Ministry of Health and Ministry of Finance and Planning, Central Bureau of Statistics. The results indicated that the primary factors determining health status include per capita income, female literacy levels, government spending in the health sector, immunization coverage, household access to doctors, and the prevalence of HIV/AIDS. Government investment in health facilities was found to be of paramount importance, especially in rural areas where most Kenyans live. Policy recommendations arising from the study results include increased government spending on rural health facilities, increased participation of the private sector in the health sector, increased support for immunization campaigns, enhancement of female education, and greater effort to prevent the spread of HIV/AIDS. In addition, general improvements in basic welfare and the environment of the community is needed.

Health care is a basic service in any effort to combat poverty. Often it is subsidized with public funds to help achieve that aim (Castro-Leal et al. 2000). In addition, human health has a major role to play in an economy’s development. A healthy population is necessary for successful industrialization; and a sound health care delivery system, good nutrition status, food security, and absence of diseases are conditions that produce healthy people capable of participating in a country’s economic, social, and political development (Kimalu 2001).

Health care is both a consumption good and an investment good. As a consumption good, health care improves welfare; as an investment commodity, health care enhances the quality of human capital by improving productivity and increasing the number of days available for productive activities (Ngugi 1999). There is a direct relationship between the health status of a population and its productivity, as demonstrated by industrial countries that now are benefiting from years of investment in health services. Castro-Leal and colleagues (2000) described another dimension of health care, arguing that it is a normal good. This means households spend on health care and use health facilities according to their incomes to improve their health status.

This chapter is a research report submitted in pursuit of a master of arts degree in economic policy management at Makerere University Institute of Economics, Kampala, Uganda, in 2003. The author’s email address is emgakunju@hotmail.com.
Other principal factors that affect the use of health facilities include service quality, access, and direct user charges.

According to Owino (1997), the provision of good health satisfies one of the basic human needs and contributes significantly to maintaining and enhancing the productivity of the people. Public expenditure on health services therefore is a key investment in human capital and plays a catalytic role in the growth of the economy by enabling people to achieve their full potential and lead productive lives.

In recognition of the importance of human health, one of the Kenya government’s major goals since independence has been to achieve adequate and good-quality health care for all citizens, as first articulated in “Sessional Paper No. 10 of 1965 on African Socialism and Its Application to Planning in Kenya” (GoK 1965).

Overview of Kenya’s Health Sector

Kenya entered the 1970s with a strong economy exemplifying the excellent macroeconomic performance of the 1960s. This performance was reflected in high growth of the overall and sectoral gross domestic product (GDP) that annually averaged more than 5 percent, a balance of payments surplus, minimal external debt burden, and price stability with the inflation rate averaging less than 4 percent a year (Gesami 1999).

The good macroeconomic performance of the Kenyan economy during the period 1960–80 was attributed to several factors, including high savings and investment ratios, expansion of smallholders’ production of cash crops, and a favorable external environment. With these factors and the resultant “golden” macroeconomic record, the country’s health sector experienced tremendous growth, especially in its public subsector. This sectoral growth was attributed to the high priority accorded to improving the health status of the Kenyans and to the country’s social economic development. During the first two decades of independence, the sector accounted for 5 percent of total central government expenditures and 6 percent of the government’s total recurrent vote. This sectoral growth was reflected in the phenomenal growth in the number of health care facilities and consequent improvement in the population’s health status. Different writers have suggested several indicators as measures of health status, including infant mortality, under-five mortality rate, and life expectancy. Infant mortality, however, is considered the most reliable indicator and is the health status measure most commonly used (Filmer and Pritchett 1999).

Infant mortality refers to the number of deaths occurring among children under one year of age. This indicator is said to reflect the health status of a given population because the survival of the infant during the first year of life depends on better nutrition, provision of medical services, and other factors (GoK 1998). In support of infant mortality as a measure of health status, Filmer and Pritchett (1999) indicated that, although there are difficulties with measuring infant mortality, it is arguably superior to alternative measures of health status. Life expectancy is not reliably measured in many countries; and figures reported in the official sources often are not based on actual data but are extrapolations from infant mortality and assumed life tables.

Table 3.1 shows the growth in the numbers of health facilities and personnel in Kenya between 1967 and 2000. As the number of health facilities increased, indicators of health status improved tremendously. For example, the infant mortality rate declined from 120 deaths to 62 deaths per 1,000 live births, and the under-five mortality rate dropped from approximately 200 deaths to 97 deaths per 1,000 live births over the same period (figure 3.1). Overall life expectancy increased from 40 years in 1965 to 60 years by 1990, and maternal mortality improved. Immunization coverage increased from 30 percent in 1965 to 70 percent in 1993, and the ratios of population to doctors and population to facilities showed positive trends (Ngugi 1999; World Bank 2001).

As figure 3.1 indicates, the remarkable performance of the country’s health sector, proxied by infant and child mortality, was not sustained after the first two decades of independence.
This was reflected by increasing infant and under-five mortality rates in the 1990s that resulted from poor performance and services delivery in the health sector. This poor performance was attributed to the harsh prevailing macroeconomic climate and to inappropriate policy responses to health and health care delivery problems, including inefficiencies and resource scarcities (Gesami 1999). The problem was compounded by the emergence of HIV/AIDS in the late 1980s and early 1990s.

By the start of the millennium, health status in Kenya had worsened. The infant mortality rate increased from 74 deaths per 1,000 live births in 1998 to 77 deaths in 2003, and the under-five mortality rate rose from 112 per 1,000 to 115 over the same period. In addition, the HIV/AIDS pandemic, which has become a significant cause of morbidity and mortality, continued to pose a great threat to all sectors of the economy.

In general, the underlying factors associated with the decline in Kenya’s health status include underfunding of the health sector, which has led to lack of drugs, inappropriate staffing and staff shortages, and poor maintenance of equipment and facilities resulting in poor or unavailable services. Furthermore, there are causes outside the health sector, including increased levels of poverty. Each year, 1.5 percent of households fall below the poverty line, and health care is almost inaccessible to poor and vulnerable groups.

**Analysis of Government Expenditure in the Health Sector**

The priority that the government gives to the health sector is reflected in the overall spending in the Ministry of Health. In the recent past, the government has increased drastically its allocation

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**Table 3.1. Growth in Health Care Facilities, Selected Years, 1967–2000**

<table>
<thead>
<tr>
<th>Year</th>
<th>Hospitals</th>
<th>Health centers</th>
<th>Number of beds and cots</th>
<th>Number of personnel</th>
</tr>
</thead>
<tbody>
<tr>
<td>1967</td>
<td>199</td>
<td>162</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>1980</td>
<td>216</td>
<td>241</td>
<td>27,691</td>
<td>19,307</td>
</tr>
<tr>
<td>1985</td>
<td>243</td>
<td>267</td>
<td>30,986</td>
<td>27,850</td>
</tr>
<tr>
<td>1990</td>
<td>268</td>
<td>299</td>
<td>33,086</td>
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<tr>
<td>1995</td>
<td>356</td>
<td>531</td>
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</tr>
<tr>
<td>2000</td>
<td>481</td>
<td>601</td>
<td>57,416</td>
<td>55,732</td>
</tr>
</tbody>
</table>


*Note: — = not available.*

**Figure 3.1. Trends in Infant and Under-Five Mortality Rates, 1960–2003**

![Chart showing trends in infant and under-five mortality rates from 1960 to 2003.](source)

to the health sector, with its expenditure provided through the recurrent and development vote, which is further divided into preventive and promotive health, curative health, general administration and planning, rural health services, and health training subvotes. Other financiers of the sector are the donor community and the private sector, including nongovernmental organizations. There is disparity in health expenditures, however, between urban and rural areas, despite the fact that only 20 percent of the population lives in urban areas. In Kenya, for instance, the 1997 Welfare Monitoring Survey III (GoK 1997) found that most of the poor households in rural areas were 60 minutes from the nearest health facility. In urban areas, the time needed to reach health facilities was 10 to 30 minutes. Similarly, the National Development Plan 2000–08 indicates that, by the year 2000, only 42 percent of the population had access to health facilities within 4 kilometers and 75 percent had access within 8 kilometers (GoK 2002). Figure 3.2 shows a trend of public expenditure on health in Kenya over the years.

Statement of the Problem to Be Studied

Over the years, the public sector has been the main provider of health care services in Kenya. However, by the year 2001, the health sector was at crossroads. Health statistics indicated tremendous decline in the performances of various health indicators between 1990 and 2001. For instance, the infant mortality rate has increased from approximately 51 deaths per 1,000 live births in 1992 to 77 per 1,000 in 2001; and the child mortality rate rose from 97 deaths per 1,000 live births in 1990 to 112 per 1,000 in 2000. Likewise, overall life expectancy declined from about 60 years to 47 years over the same period. The decline in health statistics indicated Kenya’s health situation was worsening, despite the gradual increase in public health expenditure (shown in figure 3.2). One implication of the decline is that increasing government spending is not certain to lead to the expected improvement in health status. In reality, the health status of the population in the economy is influenced by a combination of factors that includes government health spending.

This scenario in Kenya confirms variations in the determination of health status among different countries that Filmer and Pritchett (1999) found in their cross-national study of child mortality and public spending in developing countries. Also, a report by the World Bank (1994) observed that, beyond public spending, the differences among determinants of health status across countries can be explained overwhelmingly by social and economic factors in each country. In the wake of declining health status in Kenya between 1990 and 2001, determining what

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*Figure 3.2. Ministry of Health Analysis of Expenditure, 1970/71–1999/2000*

![Figure 3.2](image_url)

*Source: GoK 2000.*
factors affect health status took on paramount importance. In addition, the emergence of new diseases (such as HIV/AIDS) and the continued effects of other diseases (such as malaria) put the population at a great risk. In view of that, investigation and analysis of factors that determine health status will help improve the overall welfare of the population in the economy.

Research Objective, Scope, and Study Organization

The objective of the study is to analyze the factors that determine health status in Kenya. The study focuses on the three decades of independence, from fiscal years 1970/71 to 2000/01. The choice of this period is significant in that certain variables before 1970/71 give only an average performance, whereas the period 1970/71 to 1979/80 is a time of marked improvement in health status.

The study is divided into five sections. Section one (presented above) described the background, the research problem, the objective and the study scope. Section two provides the literature review. The study methodology and data analysis are discussed in section three, and the study findings are presented in section four. The final section offers my conclusion and policy recommendations.

Literature Review

Several researchers have tried to analyze the factors that determine health status and the overall impact of public spending on health in developing countries, but their work has not been conclusive because of variations in the outcomes. According to a report by the World Bank (1993), neither economic theory nor empirical evidence provides a clear-cut explanation of the effect of public spending on an economy’s health status. It is generally expected, however, that higher public spending will yield better health, all things being equal. Economic theory develops a rationale for government provision of goods and services, based on the failure of the market to provide public goods, internalize externalities, and cover costs when there are significant economies of scale to be internalized (Stiglitz 1993). This rationale justifies the high public spending on health care.

Filmer and Pritchett (1999) singled out public spending on primary health care and indicated that it contributes significantly to health status improvements. They added that the relatively good health status reported in Costa Rica, Kerala (India), and Sri Lanka is a result of high spending on preventive and promotive health care. They argued, however, that although it is possible that these economies’ good health outcomes result from effective health sector strategies, it is plausible that they share such nonhealth characteristics as high levels of female education, better nutrition, and more equitable income distribution. The empirical results of Filmer and Pritchett’s study revealed that 84 percent of child mortality differences are attributable to income variations.

The specific effect of income on health status, however, is ambiguous. Some studies have argued that an increase in income will lead to an improvement in health status, whereas others have argued that income is negatively related to health status. Grossman (1972) found that an increase in income (through wage increases) might lower health status (that is, reduce health capital). He explained this contradiction of his expectation from his theoretical model with the observation that people in high-income classes are likely to engage in bad health habits, such as cigarette smoking. Contrary to Grossman’s argument, however, Heller (1982) found that a household’s health status improved with increased income as members shifted away from traditional to modern health services. Similarly, the World Bank (1994) report indicated that differences in income levels across countries are a significant factor in determining health status. In addition to income, other contributory factors include female education, access to doctors, and access to clean water and sanitation services.
Ogbu and Gallagher (1992) examined the impact of shifting expenditure patterns and levels on the process of providing and the delivery of health care in five sub-Saharan African countries (Botswana, Burkina Faso, Cameroon, Ethiopia, and Senegal). Their results indicated that, in addition to the level of public spending, the expenditure mix (on salaries, drugs, supplies, and so forth), the composition of health infrastructure, community efforts, and the availability of private health care all influence health care delivery. Furthermore, per capita public expenditure alone as a determinant of health care was found to be inadequate, especially in cross-sectional country comparisons.

Per capita gross national product (GNP) also has been found to have a considerable effect on health status. Nganda (1994) compared the relationship between GNP per capita and basic health status. He found that a 1.00 percent increase in GNP per capita leads to a 1.17 percent decline in the under-five mortality rate. He concluded that health status improved with an increase in per capita GNP. Related to GNP per capita is a country’s income redistribution. Jimenez (1986) noted that income redistribution is an effective method of improving health status.

In a study on health care financing in Kenya, Gesami (1999) found that fees charged for the use of health facilities have a significant effect on the demand for health care. Her results indicated that the demand for health services fell by approximately 33 percent in government facilities and by 17 percent in nongovernment facilities after a cost-sharing strategy was implemented, thus seriously affecting the health status of the people across the country.

Manyala (2000) carried out a study on the health effects of per capita income and public expenditure on social services in Kenya, and he found that per capita income has been influential in determining health status there. In a similar study on health care and debt relief in Kenya (Kimalu 2001), individuals’ health status was found to improve with an increase in the female literacy level. Kimalu concluded that an increased female education level leads to improvements in nutrition and child health and to a decline in fertility; hence, health status improved. He also found that health status was negatively related to income inequality and indebtedness of the country. The argument regarding income inequality was that increasing inequality takes away income from the majority of the poor and leaves them with less money to spend on health care.

A comparative study by Wagstaff (2002) that focused on developing countries found that public spending on health care had a larger impact on child mortality among the poor than among the nonpoor population. In their study on the effect of foreign aid on public spending, however, Feyzioglu, Swaroop, and Zhu (1998) found that public spending in the health sector had no impact on reducing infant mortality.

In general, as the reviewed literature indicates, variations emerge in factors that influence health status in different economies. Although some factors are common, the extent and nature of the relationship differs from one economy to another. In other cases, such as income, the direction of the effect differs among researchers. Using a multivariate regression analysis, this study will try to establish the significance of social economic factors in the determination of health status from the Kenyan perspective.

**Methodology**

This section highlights the study methodology and how the analysis of data used in the study was undertaken. It also presents a brief discussion of the model and estimation techniques.

The cross-national analysis discussed in the literature review outlined variations in determination of health status. As a result, several models have been developed in an attempt to analyze these factors, despite the differences in their approach. For instance, the Grossman (1972) model looked at the demand for medical services as both an investment and a consumption activity. The model assumes that individuals maximize individual health over their lifetimes from a flow of services of health stock achieved as a result of good health status. Guilkey et al. (1987) looked at the relationship between health status and other factors in the Philippines. Adopting
the model of Guilkey et al., this study analyzes the relationship among GDP per capita, public health expenditure, household access to doctors, female literacy level, immunization coverage, and access to clean water and sanitation as they affect health status.

Using these variables in a constrained utility maximization framework, a multivariate regression analysis of the aggregate health care model is estimated as follows:

\[ H_s = f(pci, g, da, fl, imm, rw, uw, e), \]

where \( H_s \) is the measure of health status as proxied by infant mortality, \( pci \) is income per capita, \( g \) is the government health expenditure, \( da \) is the percentage of household access to a doctor, \( fl \) is the female literacy level, \( imm \) is the overall child immunization coverage, \( rw \) is the percentage of rural household access to clean water and sanitation, \( uw \) is the percentage of urban access to clean water and sanitation by households, and \( e \) is the error term.

The structural estimation equation is expressed in log form to capture the elasticities and to take care of any nonlinearities in the relationships. A dummy variable also is included in the model to assess the effect of HIV/AIDS prevalence on health status in Kenya. The model therefore is expressed as follows:

\[ \ln im = \ln pci + \ln fl + \ln da + \ln imm + \ln rw + \ln uw + \ln lg + \text{dummy} + e. \]

**Estimation Strategy**

This section highlights the test statistics on the data used in the estimation of the model. The tests carried out are stationarity (unit root) and cointegration tests.

**TEST FOR STATIONARITY.** This is a test statistic of every variable to determine whether the variable has a unit root. A time-series is stationary if its mean, variance, and autocovariance are independent of time. Nonstationary variables may provide spurious results showing significant relationships even if the variables have been generated independently.

**COINTEGRATION ANALYSIS.** This is a test statistic carried out to ascertain whether the variables have a long-run relationship. Cointegration refers to a linear combination of nonstationary and stationary variables. Lack of cointegration implies no long-run relationship.

In this study, the Engle-Granger two-step procedure (residual-based test) is used to test for cointegration. The test statistic was undertaken as follows: (1) estimating the structural model at levels, and (2) testing the residual term for stationarity using the unit root test. If the residual term has a unit root or is stationary of order zero (I[0]), then the series are cointegrated.

**Data Type and Sources**


**Research Findings**

In this section, we consider the unit root test results of the variables formulated with the augmented Dickey-Fuller (ADF) test. EViews was used as a statistical analysis tool.

The unit root tests are based on the null hypothesis of the existence of a unit root. As table 3.2 indicates, all variables were nonstationary at levels. The ADF test statistics for the variables are less than the critical value (–2.9627) at the 5 percent level of significance. This called for differencing of the variables to remove the trends and wide variations from the mean. After the first differencing, the variables became stationary. This change is reflected by the statistics in the third column of the table, which shows that the variables’ ADF test statistics values are greater
than the critical value (–2.9665) at the 5 percent significance level. This implies that the variables are integrated of order one (I(1)).

The test statistics for cointegration analysis undertaken show that the series is cointegrated; that is, the error collection term of the regression analysis has a unit root. It has an ADF test statistic of –4.769467, whereas the critical values are –3.6852, –2.9705, and –2.6242 at 1 percent, 5 percent, and 10 percent, respectively.

Analysis of the Structural (Long-run) Model

Table 3.3 shows the regression results of the structural (long-run) model estimated using the ordinary least squares method. The results in this table indicate that, although the variables have the expected signs, not all are significant in determining Kenyan health status, as proxied by infant mortality. However, the majority of the variables are significant at either 5 percent or 10 percent. The results show that per capita income was highly significant in determining health status. Data in the table show that a 0.2 percent increase in per capita income leads to a 1.0 percent reduction in infant mortality. This indicates a positive relationship between per capita income and the health of the population. These findings concur with those of Manyala (2000) and Nganda (1994). The table also shows that the female literacy level significantly determines health status: as the literacy level rises, health status improves. These findings are similar to those of Kimalu (2001).

Government health expenditure also was found to have the expected sign and significance in determining health status. As table 3.4 indicates, a 0.4 percent increase in government expenditure will lead to a 1.0 percent reduction in infant mortality. Immunization coverage was found to be significant and to have a negative relationship: a 0.13 percent increase in immunization coverage will lead to a 1.00 percent reduction in infant mortality.

The emergence of HIV/AIDS was found to be significant as well. The high prevalence of HIV/AIDS negatively affects the health status of the population. This has led not only to an increase in infant mortality but also to increased morbidity in the country.

Overall, the model has an $R^2$ of 0.82, implying that the independent variables in the structural model significantly determine the dependent variable. The independent variable explains 82 percent of the variations in the dependent variable. The $F$-statistic is also highly significant, strongly rejecting the null hypothesis of zero parameter coefficients. The Durbin-Watson statistic is also approximately 2, which suggests the absence of a serious problem of autocorrelation.

Table 3.2. Augmented Dickey-Fuller Test Statistic

<table>
<thead>
<tr>
<th>Variable</th>
<th>ADF test statistics at levels$^a$</th>
<th>ADF test statistics after 1% difference$^b$</th>
<th>Order of integration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lnnda</td>
<td>–2.142789</td>
<td>–5.689213</td>
<td>I(1)</td>
</tr>
<tr>
<td>Lnfl</td>
<td>–1.73201</td>
<td>–4.438230</td>
<td>I(1)</td>
</tr>
<tr>
<td>Lnimm</td>
<td>–1.639676</td>
<td>–4.304635</td>
<td>I(1)</td>
</tr>
<tr>
<td>Lnimm</td>
<td>–2.227739</td>
<td>–6.099414</td>
<td>I(1)</td>
</tr>
<tr>
<td>Lnlg</td>
<td>–1.463221</td>
<td>–3.377465</td>
<td>I(1)</td>
</tr>
<tr>
<td>Lupci</td>
<td>–1.271201</td>
<td>–2.995096</td>
<td>I(1)</td>
</tr>
<tr>
<td>Lruw</td>
<td>–1.275723</td>
<td>–2.981264</td>
<td>I(1)</td>
</tr>
<tr>
<td>Luuw</td>
<td>–1.214602</td>
<td>–2.977477</td>
<td>I(1)</td>
</tr>
</tbody>
</table>

Source: Author’s calculations.

Note: The variables are expressed in log form to capture the elasticities. They are defined as follows: Lnnda is the percentage of household access to a doctor, Lnfl is the female literacy level, Lnimm refers to health status as proxied by infant mortality, Lnimm is the overall child immunization coverage, Lnlg is the government health expenditure, Lupci is income per capita, Lruw is the percentage of rural household access to clean water and sanitation, and Luuw is the percentage of urban household access to clean water and sanitation.

b. Critical values: 1% –3.6752, 5% –2.9665, and 10% –2.6220.
The Short-run Model

The short-run model provides a further analysis of the model based on an in-depth specification of the variables. Table 3.4 presents the short-run estimation results of the model. From the table it is evident that the lagged error correction term is highly significant and negatively related to the dependent variable. It has a coefficient of –0.757910 with the statistic probability value of 0.0020. This satisfies one of the conditional requirements of a good specific model.

The results of the specific model show some similarity with those of the structural model. For instance, per capita income and female literacy were found to be highly significant in determining health status. The result indicates that a 0.37 percent increase in per capita income leads to a 1.00 percent reduction in infant mortality. Similarly, a 1.6 percent increase in female literacy level leads to a 1.0 percent reduction in infant mortality. Also similar to the long-run model is the government health expenditure, which is significant in determining household health status. However, it was found that government health expenditure also influences health status with a lag, implying that the current and past government investment and spending in the health sector have significant effect on the health of the population.

Other notable factors that influence health status include the immunization coverage. A 0.11 percent increase in immunization coverage leads to a 1.00 percent reduction in infant mortality. This underscores the importance of the Ministry of Health’s campaign for immunization to increase coverage in the country. Also similar to the structural model is HIV/AIDS prevalence, which is significant in determining the population’s health status. This means that in both the structural and specific models, HIV/AIDS prevalence has devastating effects on health status in Kenya.

Study Limitations

One of the major limitations is that the study uses only the central government health expenditures to explain health status. In reality, however, there are health-related expenditures undertaken by other sectors, such as local governments. As a result of this limitation, the study may have used an underestimation of the actual public expenditure in the health sector.

### Table 3.3. Regression Results of the Structural Model, Using Infant Mortality as the Dependent Variable

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>SE</th>
<th>t-Statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lnda</td>
<td>–0.013488</td>
<td>0.019436</td>
<td>–0.693972</td>
</tr>
<tr>
<td>Lnfl</td>
<td>–1.537189</td>
<td>0.741698</td>
<td>–2.072528</td>
</tr>
<tr>
<td>Lnimm</td>
<td>–0.138001</td>
<td>0.077430</td>
<td>–1.782271</td>
</tr>
<tr>
<td>Lnlg</td>
<td>–0.404159</td>
<td>0.125242</td>
<td>–3.227011</td>
</tr>
<tr>
<td>Lnlg</td>
<td>–0.204398</td>
<td>0.095055</td>
<td>–2.150309</td>
</tr>
<tr>
<td>Lnlg</td>
<td>–0.064822</td>
<td>0.116113</td>
<td>–0.558266</td>
</tr>
<tr>
<td>Lnlg</td>
<td>–0.579344</td>
<td>0.789130</td>
<td>–0.734155</td>
</tr>
<tr>
<td>Dummy</td>
<td>0.044977</td>
<td>0.026152</td>
<td>1.719767</td>
</tr>
<tr>
<td>C</td>
<td>7.275536</td>
<td>0.998585</td>
<td>7.285843</td>
</tr>
</tbody>
</table>

R² 0.821388  
Adjusted R² 0.756438  
Durbin-Watson statistic 1.796609

Source: Author’s calculations.

Note: SE = standard error. The variables are expressed in log form to capture the elasticities. They are defined as follows: Lnda is the percentage of household access to a doctor, Lnfl is the female literacy level, Lnimm is the overall child immunization coverage, Lnlg is the government health expenditure, Lnlg is income per capita, Lnlg is the percentage of rural household access to clean water and sanitation, and Lnlg is the percentage of urban household access to clean water and sanitation; the dummy represents HIV/AIDS and C is the constant.
The second concern is the possibility of measurement errors in the dependent variable (infant mortality). Although infant mortality is considered the best measure of health status, there are some logistic problems in measuring it. These problems are caused mainly by the many unregistered births and deaths, especially in the rural areas.

Conclusion and Policy Recommendations

Several factors have been identified as significant in determining health status in Kenya. These include per capita income, female literacy level, government spending in the health sector, immunization coverage, household access to doctors, and the prevalence of HIV/AIDS. However, the success of these factors in improving health will depend on their integration into a common policy framework.

In addition, the involvement of other sectors of the economy in achieving good health is imperative. For instance, the education sector is very important in raising female literacy levels. The private sector plays a vital role in supplementing funds for providing good health care to the citizenry.

Further research is needed on the effects and contributions of specific health expenditure components to the current health situation in the economy. Such research would entail analyzing the desegregated health expenditures data in relation to the various health indicators.

Because per capita income plays an important role in health status in the Kenyan economy, the government policy framework should be geared toward improving per capita income levels. This is possible by establishing a stable macroeconomic framework, which will encourage investment in the economy and thus boost development.

As the population increases, government expenditure in the health sector should increase proportionately to ease the pressure on health facilities. The government needs to continue investing in health facilities. In addition, increased funding for research and development is necessary. Such support will enhance the capabilities of the medical personnel.

Table 3.4. Summary of the Regression Results of the Short-run Model, Using Infant Mortality as the Dependent Variable

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>SE</th>
<th>t-Statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>D(Lnda)</td>
<td>−0.011334</td>
<td>0.010513</td>
<td>−1.078068</td>
</tr>
<tr>
<td>D(Lnfl)</td>
<td>−1.648247</td>
<td>0.899922</td>
<td>−1.831543</td>
</tr>
<tr>
<td>D(Lnlg[–1])</td>
<td>−0.359716</td>
<td>0.199484</td>
<td>−1.803235</td>
</tr>
<tr>
<td>D(Lnimm)</td>
<td>−0.114765</td>
<td>0.033379</td>
<td>−3.438225</td>
</tr>
<tr>
<td>D(Lnlg)</td>
<td>−0.404159</td>
<td>0.125242</td>
<td>−3.227011</td>
</tr>
<tr>
<td>D(Lnlg[–1])</td>
<td>−0.375174</td>
<td>0.182791</td>
<td>−2.052547</td>
</tr>
<tr>
<td>ECT</td>
<td>−0.757910</td>
<td>0.205065</td>
<td>−3.695944</td>
</tr>
<tr>
<td>Dummy</td>
<td>0.052113</td>
<td>0.029798</td>
<td>1.748853</td>
</tr>
<tr>
<td>C</td>
<td>0.028788</td>
<td>0.092948</td>
<td>0.309717</td>
</tr>
</tbody>
</table>

R² 0.632502  \( F \)-statistic 12.64650
Adjusted R² 0.575643  Probability (F-statistic) 0.007818
Durbin-Watson statistic 2.072407

Source: Author’s calculations.
Note: SE = standard error. The variables, which are already expressed in log form to capture the elasticities, have been differenced to remove the trends. They are defined as follows: D(Lnda) is the percentage of household access to a doctor, D(Lnfl) is the female literacy level, D(Lnimm) is the overall child immunization coverage, D(Lnlg) is the government expenditure on health, D(Lnlg[–1]) is the lagged government health expenditure, and D(Lnlg[–1]) is income per capita; C is the constant, Dummy is the effect of HIV/AIDS on health status, and ECT is the error collection term.

The second concern is the possibility of measurement errors in the dependent variable (infant mortality). Although infant mortality is considered the best measure of health status, there are some logistic problems in measuring it. These problems are caused mainly by the many unregistered births and deaths, especially in the rural areas.
Immunization is a very important contributor to good health because it guards against possible infection and disease and thus helps reduce government expenditures in curative health. The government needs to step up the immunization coverage to improve the population’s current and future health status.

The role of the private sector, nongovernmental organizations, faith-based groups, and the civil society in providing health care cannot be overemphasized. To support that role, the government should create an enabling framework by which the private sector will invest in the health sector. Furthermore, the government should ensure that poor people are not discriminated against in the provision of and their access to health care.

Education of girls is of paramount importance in improving the health status of the overall population. Efforts to raise the education levels of women should be encouraged, with efforts made to subsidize the high cost of education to raise school enrollments, especially among girls.

The effect of HIV/AIDS on the economy is enormous. The epidemic not only has led to a sharp increase in health expenditures but also has led to increases in the number of orphaned children and to high dropout rates among schoolchildren who must care for their siblings. In general, the disease has led to an increased burden on the economy. In this regard, increased efforts against the disease are necessary. A campaign of education and prevention will help reduce the infection rate and, consequently, the effect of the epidemic on the economy.

Provision of clean water and sanitation is an important element in ensuring good health in Kenya. Environmental surroundings are equally important. To promote a clean environment, the government should ensure there is proper disposal of waste products. Indeed, most of the current killer diseases, such as malaria, typhoid, and cholera, result from poor hygiene, lack of clean water and sanitation, and a dirty environment. The government, together with the private sector, should invest more in basic social services to improve the living conditions of the people.

References


———. 2001. World Development Indicators. Washington, DC.
Using household panel data constructed from the Vietnam Living Standards Surveys of 1992–93 and 1997–98, this report examines the level of risk sharing among households. It also identifies vulnerable households and their risk-coping strategies to identify whether the poor are insured against adverse income risks and how existing public social welfare programs perform in Vietnam. The instrumental variable results show a good level of risk sharing taking place within very small communities, but income risks are not insured on the larger scale. Five findings on the identification of vulnerable households emerge: female-headed households are more vulnerable than male-headed households, ethnic-minority households are more vulnerable than ethnic-majority ones, households that own agricultural land are less vulnerable than households that do not own any land, and households in poor wealth deciles and those located in the Red River Delta area are most vulnerable. The study also identifies the main risk-coping strategies adopted by households are self-insurance strategies—selling assets, withdrawing savings, borrowing from relatives and friends, and using credit. There is evidence that Vietnam’s current safety net system fails to target the most vulnerable groups.

Poverty reduction is one of the most important goals in most developing countries. The World Bank (2003) has referred to poverty as a state of deprivation involving multiple dimensions—from limited income or limited opportunities to generate income, to a lack of assets to protect consumption in difficult times, to vulnerability in the face of adverse shocks, to few possibilities for conveying demands and grievances to those who could address them, and to little opportunity to participate in collective decision making. In eliminating poverty, countries have to cope with factors that affect welfare not only to lift out of poverty those who are currently poor, but also to prevent those who are currently not poor from falling into poverty.

In developing countries, many people often face severe poverty and substantial risks that lead to extremely variable incomes. These fluctuations in income can present an acute threat to people’s livelihoods even if, on average, incomes are high enough to maintain a minimal standard of living. Adverse shocks to income can strongly affect particular groups, widening the gap between the rich and poor populations and making inequality more severe.

Government intervention often is recommended to protect the poor from the consequences of economic shocks. In principle, a government-supported safety net can reduce poverty either by protecting nonpoor people from becoming poor or by helping people out of poverty (Drèze 4

Responses to Poverty and Risks in Vietnam: How Effectively Does the Current Public Safety Net Target Vulnerable Populations?

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and Sen 1989). Little is known, however, about the performance of existing public transfers as a safety net in a developing transition economy, such as that of Vietnam. There is even less information on how adverse shocks to income are insured against through safety net arrangements.

Vietnam has a system of centrally determined and mandated poverty and social welfare programs implemented by local authorities according to local norms and local poverty standards. These are locally financed in large part with scarce resources. Thus, although Vietnam reports that its fair share of public spending on transfers might serve the role of a public safety net, there is a question whether sufficient central and provincial allocations ever reach the communes. Also, there is some doubt about the performance of the current safety net system because of the widening inequality over the period from 1992 to 2002.

In light of these concerns, this study asks how adverse shocks to income are insured against, and how well existing social welfare programs can target and protect the poor from economic shocks in Vietnam. Cox (2002) investigated the effect of adverse shocks to income, showing that private interhousehold transfers in Vietnam in the early and late 1990s were large and apparently responsive to changes in household pretransfer income, and that they rose upon retirement or widowhood and following a typhoon. However, the study provided no information on the sharing level of income risks or how people in Vietnam insure themselves against such risks. Studies of the social safety net in Vietnam, using cross-household and cross-commune regressions of transfer programs' spending, have suggested that more money is spent on the poor in richer communes (Van de Walle 2001). Others have noted the lack of cross-commune resource redistribution and the consequent disparities between communes in their abilities to provide basic services and assistance to the local poor (Litvack 1999). Nevertheless, little is known about how to identify poor people for transfer programs, or how much transfer programs have achieved in protecting the poor.

As a complement to existing studies on the safety net in Vietnam, this study addresses whether poor people are insured against adverse risks, and how well the existing public social welfare programs contribute to that outcome in Vietnam. Because the desirability of safety net policies depends on how well preexisting risk-sharing arrangements work, this study examines the level of income risks shared among households in Vietnam, across regions and communes. This study also identifies vulnerable groups and coping mechanisms to find out if the current social welfare programs reach the neediest groups and provide equal accessibility to protect the poor.

This study uses panel data methods, deploying instrumental variable (IV) and multivariate probit techniques in examining risk sharing and the safety net in Vietnam. A review of the literature suggests that this is the first attempt to apply such methods in studying these issues in Vietnam.

This report begins with an overview of Vietnam’s existing social safety net and then discusses the theoretical background for the analysis. That discussion is followed by descriptions of the data and the empirical implications of the theories and results, and by a discussion of the empirical tests.

**Background**

The Vietnamese economy has had high and relatively stable average annual growth rates of 7.5 percent over the period 1995–99. Since the renovation (Doi moi) in 1986, achievements in terms of poverty reduction are some of the greatest success stories in economic development. For instance, 58.1 percent of the population lived in poverty in 1993, but this fell to 37.4 percent in 1998 and to 28.9 percent in 2002 (World Bank 2003). The question remains, however, will rapid economic growth be enough to eradicate poverty within the next few years?

---

1. A commune (xã) includes several units, or villages, each numbering from a few dozen households to more than a hundred.
Although the pro-poor nature of economic growth in Vietnam over the period 1992–2002 provides good reason to be optimistic, there are also signs that economic development is becoming less inclusive. Poverty rates and the speed of poverty reduction vary considerably across regions and between urban and rural areas. There is also an increasing disparity between urban and rural populations, and, among the latter, a worrying situation in terms of ethnic minorities. For instance, whereas food poverty is almost eliminated in urban areas, it still affects more than 40 percent of the population among ethnic minorities and it showed almost no decline from 1998 to 2002. (Because poverty has such a strong spatial dimension in Vietnam, this study develops regional effects and controls for different ethnic groups and wealth levels.)

Many households in Vietnam are still vulnerable to falling into poverty when facing adverse income shocks. Nguyen (2003) estimated that between 5 and 10 percent of Vietnam’s population is vulnerable to falling into poverty. In theory, safety net programs have the potential to mitigate the adverse impacts of economic shocks. The question is whether safety nets in Vietnam play that role in practice. At the same time, the trend toward increased inequality requires a deep re-consideration of public expenditure and public investment programs.

Vietnam’s public safety net covers a broad range of areas, including social protection, hunger eradication and poverty reduction, social insurance, health insurance, and employment and unemployment services. In principle, this safety net is designed by the government to help social beneficiaries, especially those in vulnerable groups, live above minimum living standards. In practice, however, programs are often ad hoc, poorly funded, and largely reliant on scarce local resources. For example, since 1988, user fees have been introduced for health care services and for all but primary schooling, and these have resulted in vastly increased total health and education out-of-pocket spending. Targeted school fee exemptions and compulsory health insurance schemes were instituted to redress the issues of access by the poor that these new fees have produced. But these initiatives give limited relief because fees account for only a small share of total school-related expenditures (Behrman and Knowles 1999), and people who are better off are found to be the main participants in the health insurance plans (Wagstaff and Nguyen 2002).

Initiatives also are carried out to assist solitary elderly people, children in especially difficult circumstances, disabled people, victims of natural calamities, and periodically starving people. These assistance programs, however, are centrally mandated but locally implemented, often relying heavily on scarce local resources. In 1999, for instance, there were nearly 1 million people eligible for such assistance, but only 20 percent of them actually received the allowance and 2 percent were cared for at social institutions (MOLISA 1999).

Pensions and other employment-related social insurance payments are provided only to workers in the formal sector. Unemployment insurance is not available, so it is extremely difficult for those who lose their jobs and have no other income.

There is a contingency fund run by the central government to minimize the consequences of natural calamities and other emergencies by dispensing disaster relief to regions and households. Field studies indicate, however, that emphasis is placed primarily on surviving the emergency, and that credit is a common instrument for disaster recovery (Benson 1997; Beckman, Le, and Le 2002). Because institutional capacity and finances are limited, the aid tends to be short of what would be necessary to get households back on their pre-crisis development paths. Poor households in particular are prone to further impoverishment as a result (Beckman, Le, and Le 2002).

A series of national development programs has been introduced to transfer resources to specific groups, covering employment generation, reforestation, school and health fee exemptions, microcredit schemes, and physical infrastructure investments. In theory, the determination of poverty and need is based on income measurements; in practice, however, identifying beneficiaries is based on a more participatory method. To allocate whatever benefits are available, assemblies at the village level debate and sometimes vote on the poverty status of village residents.

2. These are people who normally suffer from lack of food in the times between two harvests.
Risk Sharing and the Perfect-Insurance Model

People in developing countries often face shocks on a daily basis. For example, the failure of crops or investments (such as death of livestock) that are their main sources of income can threaten their living. People also have to cope with adverse movement in the prices of key agricultural commodities, unstable employment opportunities, or natural disasters. Accident, sickness, or sudden death affecting a household head or family member also may disable a household. Macroeconomic instability, high inflation, and underdeveloped legal systems also create a significant negative impact on the value of household resources.

Under these uncertainties and adverse shocks, households face the problem of how to reconcile income fluctuation with desirable stable consumption. Theoretically, this problem can be investigated as a problem of intertemporal consumption smoothing under a stochastic income process. The role of idiosyncratic and aggregate risks in determining the nature of poverty is examined in recent microeconomic development literature, which addresses the effectiveness of formal and informal household risk insurance mechanisms (Alderman and Paxson 1992; Morduch 1995; Townsend 1994; Deaton 1997). Risk sharing and its level among households are this study’s interests in investigating the economic phenomena under uncertainties in a developing country such as Vietnam.

To investigate the level of risk sharing among households in Vietnam, this study examines the full-insurance model, following Townsend (1994) and Jalan and Ravallion (1999). The model assumes that perfect risk sharing within the group will result in members’ individual consumption being protected from idiosyncratic risk. Consumption still may vary, but the source of fluctuation is the aggregate risk that cannot be insured against by risk-pooling mechanisms. The implication is that, in a Pareto-efficient allocation of risk in a community (whereby improving one household’s lot does not imperil that of another), households face only aggregate risk. Idiosyncratic income shocks are insured against completely within the community. In other words, if a household is completely insured against idiosyncratic shocks within the society, then (after controlling for household preference shocks such as taste shifter) change in household consumption depends only on the growth rate in aggregate shocks. This also predicts that, if controlling for aggregate shocks, individual consumption should not be affected by idiosyncratic income shocks.

Many scholars have done tests of perfect insurance among households in developing countries, and their tests have yielded different results. Townsend (1994) presented a general equilibrium framework, which jointly evaluated all actual institutions of any kind, to test the full-insurance model using data from three poor, high-risk villages in the semiarid tropics of southern India. The implication is that all individual consumption is determined by aggregate consumption, no matter what the date and history of shocks, so individuals’ consumption will move together. The full-insurance hypothesis was rejected statistically, but it does provide a surprisingly good benchmark. Household consumption co-moves with village average consumption and is little influenced by idiosyncratic shocks, controlling for village consumption (that is, for village-level risk). Kohara, Ohtake, and Saito (2002) tested the full-insurance hypothesis in Japan and found similar results. The full-insurance hypothesis again was rejected statistically, but a large fraction of idiosyncratic shocks were insured in markets or other mechanisms.

The perfect-insurance model provides two important implications. The first is that if perfect insurance exists, then (after controlling for household-specific preference shocks) changes in household consumption depend only on changes in aggregate consumption used to capture aggregate shocks. The second implication—alternatively exclusive from the first—states that, after

3. For details of the mathematical derivation of the model, refer to the full version of this report in the International and Development Economics Program Working Paper Series, Crawford School of Economics and Government, College of Asia and the Pacific, the Australian National University.
controlling for household-specific factors and aggregate shocks, household consumption should not depend on changes in household income, which is used to capture idiosyncratic shocks.

These two implications are followed by two directions of empirical works in estimating the theoretical model. A number of studies have estimated the model by regressing the deviation from village-mean consumption on income change, or regressing household consumption change on change in village-mean consumption as well as household income to show that village-mean consumption and household consumption move together (Hess and Shin 2000; Gomes and Michaelides 2003). Others examined the model using an alternative specification in which changes in household consumption are regressed on changes in household income (used to capture idiosyncratic shocks) and a village dummy (used to capture aggregate shocks) to investigate whether consumption is affected by the shock-induced change in income (Jalan and Ravallion 1999; Kohara, Ohtake, and Saito 2002; Skoufias 2003).

These two directions contribute equally to the literature on the analysis of risk sharing. Using aggregate consumption in the first direction in the analysis, however, may overlook the effect of idiosyncratic shocks that may affect several households at the same time or shocks that are specific for a group of households. Therefore, the co-movement of consumption and aggregate consumption may not reflect a good level of risk sharing. Instead, a co-movement simply may represent an overall bettering or worsening of the whole economy when the country experiences a good development or a macroeconomic shock. Thus, perfect risk sharing does not imply that individual consumption should co-move perfectly with aggregate group consumption over time. If none of the risks affect the per-period marginal utility function, then perfect insurance will imply co-movement. But there may be risks that affect marginal utility of consumption. For example, illness in any period may increase (or reduce) the household’s marginal utility from consumption in that period. In such cases, idiosyncratic variation in consumption will remain. Also, this will give biased estimates of the excess sensitivity parameter in a downward direction to accept the null hypothesis whenever there is a common aggregate component in household-level income changes. This occurs because the variable used contains both idiosyncratic and aggregate income effects and therefore provides a noisy measure of idiosyncratic income risk (Ravallion and Chaudhuri 1997).

The change in household consumption model is robust to the problem of attenuation bias from the aggregate component because this specification allows a separation of aggregate risk from idiosyncratic income effects. This approach suffers, however, from the problems of measurement error and endogeneity in household income. Fortunately, there are econometric tools to deal with the problem of measurement error and, in the method chosen, to analyze the Vietnam Living Standards Survey data that include detailed household consumption and income.

**Empirical Analysis: Are Vietnam’s Poor People Well Insured?**

This section first explains the data used for this study and then investigates whether Vietnam’s public safety net targets the neediest population.

**Data and Descriptive Statistics**

The household panel data used in this study are constructed from the 1992–93 and 1997–98 Vietnam Living Standards Surveys. The surveys collected information on household demographic structure, education, health, employment, agricultural activities, and food and nonfood expenditures as well as information on household income from various sources. In selecting the sample of households for the study, only households interviewed in both surveys are included. This restriction led to a total of 4,300 households (in 150 communes across eight regions) in the analysis, comprising 3,396 households in rural areas and 904 households in urban areas.

The variables used in all regressions in this study are calculated at the household level. The main variables are household change in consumption per capita and household change in in-
come per capita. The measure of consumption expenditure includes cash and imputed in-kind spending on food, tobacco, and nonfood items. The income variable includes both cash and imputed values for in-kind income from various sources. Income received as a gift or remittance from relatives and money borrowed are not included because these sources of income are likely to be the insurance mechanism adopted by households to deal with adverse shocks. Means of key variables are reported in table 4.1.

To test for systematic interhousehold differences in the extent of insurance, the sample is stratified by household wealth per capita. Household wealth comprises physical wealth (including fixed productive assets such as farm equipment and machinery), business assets, housing, and durable goods. Land is excluded because a land market is virtually nonexistent; because of government regulations, land cannot be bought or sold, so placing a value on land is difficult. Households are grouped into three categories by wealth per person: poorest decile (0–10 percent), middle decile (11–60 percent), and rich decile (61 percent and above).

Variables used to identify shocks experienced by households are based on issues existing in the social system regarding health status, unemployment, and occurrence of natural disasters. Each member of the household was asked if he or she was unemployed between the two survey periods, and was asked to give the number of days that he or she could not carry out normal activity as a result of illness or injury over the four weeks immediately preceding the survey. Then the individual responses to these questions were aggregated at the household level. For the natural-disaster variable, the household head was asked if the household faced any disaster, including typhoon, flood, or drought, over the preceding 12 months.

Variables on coping mechanisms used to examine how households respond to shocks included (1) net private transfer; (2) net debt status; and (3) three dummy variables indicating (a) if the household sold assets or withdrew money from savings over the preceding 12 months, (b)

<table>
<thead>
<tr>
<th>Table 4.1. Means of Key Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Variable</strong></td>
</tr>
<tr>
<td>Number of households</td>
</tr>
<tr>
<td>Change in consumption per capita (thousands of Vietnamese dong)</td>
</tr>
<tr>
<td>Change in income per capita (thousands of Vietnamese dong)</td>
</tr>
<tr>
<td><strong>Shock variable</strong></td>
</tr>
<tr>
<td>HH member was unemployed (%)</td>
</tr>
<tr>
<td>HH member was ill or injured (%)</td>
</tr>
<tr>
<td>HH faced natural disaster (%)</td>
</tr>
<tr>
<td><strong>Coping strategy</strong></td>
</tr>
<tr>
<td>Net debt (thousands of Vietnamese dong)</td>
</tr>
<tr>
<td>Net private transfers (thousands of Vietnamese dong)</td>
</tr>
<tr>
<td>Positive net debt (%)</td>
</tr>
<tr>
<td>Positive private transfer (%)</td>
</tr>
<tr>
<td>Sold assets/withdrew savings in past 12 months (%)</td>
</tr>
<tr>
<td>HH member got 2nd job (%)</td>
</tr>
<tr>
<td>Had support from safety net programs (%)</td>
</tr>
</tbody>
</table>

Source: Author’s calculations.
Note: HH = household. Figures in parentheses are standard deviations.
if any household member had a second wage-earning job, and (c) if the household received support from safety net programs. Net private transfer was calculated as the difference between the amount of money received from relatives, friends, or other organizations and the amount given to relatives or friends. Net debt was constructed as the sum of funds borrowed minus funds given as loans.

Quality of the Public Safety Net

The empirical study first examines the preexisting risk-sharing level among households and then attempts to identify vulnerable populations. Finally, in determining what types of coping strategies are adopted by each population group, this study is able to evaluate whether the safety net is an effective mechanism for most vulnerable populations in coping with shocks.

Estimating Level of Risk Sharing Experienced among Households. The following regression is estimated to examine if households share risks in Vietnam:

$$\Delta c_{itm} = \beta_0 + \beta_1 \Delta y_{itm} + \delta D_{itm} + X_{itm} g + u_{itm},$$

(4.1)

where $c_{itm}$ and $y_{itm}$ are, respectively, consumption per capita and income per capita of household $i$ at time $t$ for community $m$; $X_{itm}$ is a vector of household characteristics included to capture household preference effects; $D_{itm}$ is a set of binary variables identifying each community separately; and $u_{itm}$ is the error term. Aggregate income risk is captured by the community dummies, and idiosyncratic income risk is captured by change in per capita income (which is used instead of change in household income because it could capture the effect of idiosyncratic shocks more accurately, considering variation in household size). If there is perfect risk sharing within the community, after controlling for common community effects, then changes in income should have no effect on consumption—that is, $\beta_1 = 0$ for all of community $m$.

Two sets of community dummies are used for $D_{itm}$: one is at commune level and the other is at regional level to test for differences in the levels of risk sharing within communes (smaller communities) and within regions (larger communities). Household characteristics should be included in the estimation to control for household-specific preference shocks in a consumption pattern. Thus, variables included in $X_{itm}$ are age and age-squared of household head, gender of household head, change in household size, and change in total household labor hours (used as a proxy for leisure). Change in household size is included in $X_{itm}$ to present the possibility of some economies of scale in a household’s production function, as noted by Townsend (1994) and Lanjouw and Ravallion (1995).

The results of estimating equation (4.1) by ordinary least squares (OLS) are reported in table 4.2. The statistically significant coefficients of $\beta_1$ show that consumption is not completely insured against idiosyncratic income shocks at either the regional level or the commune level. However, the higher coefficient at the regional level (0.2) suggests the existence of some partial risk-sharing mechanisms at a smaller level of community.

The OLS estimates may be biased because of the endogeneity of income and measurement error in the income variable. Thus, in estimating this model, change in income per capita, which is used to capture idiosyncratic shocks, is treated as endogenous because a household’s responses to idiosyncratic shocks in income (which are unobserved effects included in the error term) may correlate with income. A household may be using some income components for consumption smoothing. For example, to cope with a crop failure, a household may search for other sources of income, such as a job in a nonagriculture sector. Thus, a household faced with a negative income shock prompted by crop failure can gain a positive income source from nonagriculture wages. This endogeneity in income causes an upward bias to the coefficient in change in income per capita. This upward bias, however, works in the opposite direction to the standard downward attenuation bias produced by the measurement errors in income variables. The net effect cannot be signed in advance, so IVs are used to control for these sources of bias.
Shock variables ($Z$)—including (1) a dummy variable that indicates if a household member was unemployed between the two surveys, (2) the number of days household members could not carry out usual activities because of illness or injury, and (3) a dummy variable indicating that a household faced some natural disaster over the preceding 12 months are used as instruments for per capita income change. By introducing the direct shocks to income, it is possible to capture the actual effect of idiosyncratic shocks on household income. The same instruments can address the measurement error in income because these shocks are major sources of income changes, and therefore are strongly correlated with income. But by excluding the imputations, the spurious correlation between consumption and an unobserved income component is avoided.

Table 4.2 also reports the results of estimating equation (4.1) using IVs. We still find a higher significant coefficient (1.092) in IV estimates than in OLS estimates. Estimating equation (4.1) at a regional level using regional dummies may not capture the effects of common shocks as closely as commune dummies do, so the attenuation bias may exceed the endogenous bias, resulting in a higher coefficient. However, the significant coefficient still explains a shortage of risk-pooling mechanisms at a wider scale, such as at the regional or national level.

To investigate whether partial insurance and risk sharing exist among households, estimation of an alternative form of equation (4.1) is implemented:

$$
\Delta c_{itm} = \beta_0 + \beta_1 \Delta y_{itm} + \beta_2 \Delta y_{itm} + X_{itm} \gamma + u_{itm},
$$

where $\Delta y_{itm}$ is average community income. In a community with perfect risk sharing, it implies that $\beta_1$ should be equal to 0 and $\beta_2$ should represent household marginal propensity to consume.
If there is no risk sharing at all, it is expected that $\beta_1$ should represent household marginal propensity to consume and $\beta_1 = 0$. Evidence that the change in average income per capita has significant effect on change in household consumption (that is, $\beta_2$ is different from 0) is consistent with the hypothesis that some risk sharing is taking place within the community. This suggests that if partial insurance and risk sharing take place, both $\beta_1$ and $\beta_2$ should be statistically significantly different from 0, and the extent to which $\beta_1$ and $\beta_2$ are different from each other would explain the relative level of partial risk sharing within the community.

The estimated coefficients of changes in average community income are reported in table 4.3. The coefficients are significant at the commune level and insignificant at the regional level. This is consistent with the conclusions that there is some risk sharing taking place in smaller communities and that there is a lack of insurance mechanisms at a higher administrative level, which is consistent with the results in table 4.2.

Hausman-Wu tests were conducted to test for the endogeneity of changes in income per capita and the quality of IVs used. These and the results of the overidentification test, and the first-stage statistics of IV estimation and $F$-statistics are reported in table 4.4. The high value of $F$-statistics (12.59) shows the efficacy of shock variables used as instruments for change in income per capita.

### Identification of Vulnerable Groups

The principal results suggest that there is a lack of preexisting insurance mechanisms to share risks, and it is necessary to identify who are most vulnerable to adverse income shocks. To investigate if the current insurance mechanisms work equally for households with different characteristics, the differences in household vulnerability can be evaluated by estimating an amended version of equation (4.1):

$$\Delta c_{itm} = \beta_0 + \beta_1 \Delta y_{itm} + \gamma D_{it} + \chi_{itm} \lambda + (A_{it} \times \Delta y_{itm}) \phi + \epsilon_{itm},$$

(4.3)

where $A$ is a dummy variable identifying households with specific characteristics. Parameter $\phi$ reflects the extent to which there is higher or lower covariation between income and consumption changes in the group of households with that specific characteristic, relative to the reference group of households without that characteristic.
First, equation (4.3) is estimated for each characteristic when \( A \) identifies (1) household poverty status (according to three wealth deciles as described above), (2) household expenditure level (five expenditure quintiles), (3) urban or rural household location, (4) location of household in one of the eight regions covered by the survey, (5) farm or nonfarm nature of the household, (6) presence of children younger than 6 years of age in the household, (7) household ownership of agricultural land, (8) female head of household, and (9) household membership in a minority ethnic group. These characteristics are treated as time invariant, and the data gathered in the first survey are used to assign values for \( A \).

Table 4.5 includes the results from the estimation of equation (4.3). Households that belong to the poorest wealth decile are most vulnerable, and households that belong to a less-rich wealth decile are more vulnerable than households in a richer decile. This result indicates that poor people are less well insured, have less access to insurance mechanisms, and bear the brunt of persistent credit- and risk-market failures. Although the rich decile (61 percent and above) is less vulnerable, its statistically significant coefficient still provides evidence of a failure to insure fully.

For expenditure quintile groups, surprisingly, households in the richest quintile appear to be most vulnerable. This result suggests that even the richest expenditure quintile group is not insured against adverse income risks and thus may fall easily into a poverty trap. There also are statistically significant differences in household vulnerability by region. In particular, households in the Red River Delta region are most vulnerable. This may result from the area’s high density of population and its more frequent incidence of flooding.

The results also show that female-headed households are more vulnerable than male-headed ones, and households belonging to ethnic minority groups are more vulnerable than households belonging to ethnic majority groups. Another finding is that households that own agricultural land are less vulnerable than households that must cultivate rented or cooperatively owned land. This suggests the importance of land rights for households. From the total sample,
81.83 percent of households have legal use rights of agricultural land and 90.00 percent of households in rural areas have use rights of agricultural land. This contributes to the analysis on the success of the land reform in Vietnam that has occurred since the early 1990s.

There is a concern that the differences in household vulnerability can come from the discrimination of current household status (that is, a household’s private sources in coping with

<table>
<thead>
<tr>
<th>Table 4.5. Identifying Vulnerable Households: Effect of Income Shocks on Consumption by Each Characteristic of Households</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Variable</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Wealth groups</td>
</tr>
<tr>
<td>Poorest decile (reference group)</td>
</tr>
<tr>
<td>Middle 11%–60%</td>
</tr>
<tr>
<td>Rich 61% and above</td>
</tr>
<tr>
<td>Expenditure quintile groups</td>
</tr>
<tr>
<td>Poorest (reference group)</td>
</tr>
<tr>
<td>Poor-middle</td>
</tr>
<tr>
<td>Middle</td>
</tr>
<tr>
<td>Middle-upper</td>
</tr>
<tr>
<td>Richest</td>
</tr>
<tr>
<td>Region</td>
</tr>
<tr>
<td>Red River Delta (reference group)</td>
</tr>
<tr>
<td>Northeast</td>
</tr>
<tr>
<td>Northwest</td>
</tr>
<tr>
<td>North central coast</td>
</tr>
<tr>
<td>South central coast</td>
</tr>
<tr>
<td>Central highlands</td>
</tr>
<tr>
<td>Southeast</td>
</tr>
<tr>
<td>Mekong River Delta</td>
</tr>
<tr>
<td>HH in rural area (reference group)</td>
</tr>
<tr>
<td>HH in urban area</td>
</tr>
<tr>
<td>Nonfarm HH (reference group)</td>
</tr>
<tr>
<td>Farm HH</td>
</tr>
<tr>
<td>All other HHs (reference group)</td>
</tr>
<tr>
<td>HH with children under 6 years of age</td>
</tr>
<tr>
<td>HH head is female (reference group)</td>
</tr>
<tr>
<td>HH head is male</td>
</tr>
<tr>
<td>HH belongs to minority ethnic group (reference group)</td>
</tr>
<tr>
<td>HH belongs to majority ethnic group</td>
</tr>
<tr>
<td>All other HHs (reference group)</td>
</tr>
<tr>
<td>HH owns agricultural land</td>
</tr>
</tbody>
</table>

Source: Author’s calculations.

Note: HH = household; IV = instrumental variable; OLS = ordinary least squares; SE = standard error. Change in per capita income is treated as endogenous instrumented out using (1) a dummy variable indicating if household’s member is unemployed between the two surveys, (2) the number of days household’s member cannot carry out usual activities because of illness or injuries, and (3) a dummy variable indicating if there is a natural disaster. Additional variables included but not reported are age and age-squared of head of household, a dummy variable to indicate if head of household is female, change in household size, and change in total household labor hours.

+ p < .10.
* p < .05.
** p < .01.
It is also reasonable to suppose that richer households with higher wealth per capita have more capacity to insure themselves against idiosyncratic income shocks by using their own wealth. This is tested by controlling for the level of household wealth and by including all household characteristics at the same time. Thus, \( A \) is a set of variables that includes all the household characteristics listed above. The results of this regression, reported in table 4.6, are consistent with the results from regressing each characteristic separately. The findings indicate a significantly negative coefficient for the interactive-term when a household is headed by a male, belongs to a majority ethnic group, or has the use right of agricultural land.

### Estimation of Shocks and Insurance Strategies

We find that households experience a low covariation between change in consumption per capita and change in income per capita, which may suggest a level of partial risk sharing taking place within the communities. However, this low covariation also may reflect the self-insurance strategies adopted by the households rather than risk sharing among households in the communities. As a consequence of self-insurance activities, households may become less vulnerable to risk in the short term when their future vulnerability actually may be increasing.

Analyzing adopted coping strategies may indicate if households really have been insured by the formal insurance mechanisms of the country’s current safety net or if they have adopted self-insurance mechanisms. Thus, the results may imply the level to which current safety is effective in terms of targeting specific needy groups. In coping with adverse income shocks, households can adopt some strategies that are formal or informal or self-insurance mechanisms. The strategies \( S_j \) under investigation include (1) household has support from safety net trans-

### Table 4.6. Identifying Vulnerable Households: Effect of Income Shocks on Consumption by All Characteristics of Households

<table>
<thead>
<tr>
<th>Variable</th>
<th>OLS estimate</th>
<th>IV estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coefficient</td>
<td>Robust SE</td>
</tr>
<tr>
<td>Wealth groups</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poorest decile (reference group)</td>
<td>0.28**</td>
<td>0.06</td>
</tr>
<tr>
<td>Middle 11%-60%</td>
<td>-0.15*</td>
<td>0.09</td>
</tr>
<tr>
<td>Rich 61% and above</td>
<td>-0.29**</td>
<td>0.05</td>
</tr>
<tr>
<td>HH in urban area</td>
<td>0.05</td>
<td>0.04</td>
</tr>
<tr>
<td>Farm HH</td>
<td>-0.06*</td>
<td>0.03</td>
</tr>
<tr>
<td>HH with children younger than 6 years of age</td>
<td>0.03</td>
<td>0.04</td>
</tr>
<tr>
<td>HH head is male</td>
<td>-0.05</td>
<td>0.04</td>
</tr>
<tr>
<td>HH belongs to majority ethnic group</td>
<td>-0.049*</td>
<td>0.029</td>
</tr>
<tr>
<td>HH owns agricultural land</td>
<td>-0.02</td>
<td>0.03</td>
</tr>
<tr>
<td>Number of observations</td>
<td>4,300</td>
<td></td>
</tr>
<tr>
<td>( R^2 )</td>
<td>0.3263</td>
<td></td>
</tr>
</tbody>
</table>

Source: Author’s calculations.

Note: HH = household; IV = instrumental variable; OLS = ordinary least squares; SE = standard error. All household characteristic variables are included at the same time in the regression. Change in per capita income is treated as endogenous instrumented out using (1) a dummy variable indicating if household’s member is unemployed between the two surveys, (2) the number of days household’s member cannot carry out usual activities because of illness or injuries, and (3) a dummy variable indicating if there is a natural disaster. Additional variables included but not reported are age and age-squared of head of household, a dummy variable to indicate if head of household is female, change in household size, and change in total household labor hours.

* \( p < .10 \).
* \( p < .05 \).
** \( p < .01 \).
fer programs, to assess if the current safety net reaches the most vulnerable groups; (2) household reports positive net debt; (3) household applies a self-insurance mechanism, such as withdrawing savings or selling an asset; (4) household has positive net private transfer; and (5) household member gets a second wage-earning job.

To examine if current safety net programs reach the poor, and to identify what kinds of insurance mechanisms are applied in coping with idiosyncratic shocks, the multivariate probit method is used to estimate the following:

\[ P(S_{it} = 1) = G(\alpha_0 + \alpha_1 Z_{it} + X_{it} g). \] (4.4)

Shock variables \( Z_{it} \) include (1) a dummy variable indicating if a household member is unemployed between the two surveys, (2) the number of days that household members cannot carry out usual activities as a result of illness or injuries, and (3) a dummy variable for the occurrence of natural disasters. Again, \( X_{itm} \) is a vector of household characteristics, which include age and age-squared of household head, gender of household head, change in household size, and change in total household labor hours. The probit method will yield the probability that a household adopts one of the strategies in \( S_{it} \) in coping with each kind of shock \( Z_{it} \). In this estimation, the use of the multivariate probit method is justified by its advantage of allowing for correlation between choices because households can adopt different coping mechanisms at the same time when facing shocks.

Table 4.7 presents the results of the estimation with and without regional dummies. When faced with unemployment, the high value and highly significant results on the choice of private transfer (0.26 and 0.24 for with and without regional dummies, respectively) show that households are more likely to insure themselves by depending on private transfer from relatives and friends. Another approach is to sell assets or withdraw savings, even though the coefficient for this choice is weakly significant. Households do not have access to a public safety net or do not borrow because there is no unemployment insurance.

The findings provide interesting implications about a household’s responses to shocks when we combine them with findings on household vulnerability. Households at a lower wealth level are especially vulnerable, but their main coping mechanism is self-insurance, including asset sale, savings withdrawal, and private transfers. Such households hardly could protect themselves using these mechanisms, however, because they have limited marketable assets that can be sold in response to adverse income shocks. The results also show that households are likely to rely on the public safety net to insure their risks only when they face a natural disaster. In other words, the current public safety nets give support to households only when natural disaster occurs. The small marginal effect of public safety nets (0.0134, as reported in table 4.7), however, suggests they are minimally efficient in insuring households against income shocks caused by natural disasters.

To investigate whether the public safety net fails to target the poor and vulnerable households, the probability that vulnerable households (that is, households with one of five characteristics that identify them as vulnerable) receive support from the public safety net programs when faced with shocks is evaluated by interacting those five household characteristics and a dummy variable that a household receives support from the social safety net. The multivariate probit estimation results on the probability that households get support from a public safety net are reported in table 4.8. Findings indicate that female-headed households are less likely than other households to get support from safety net programs (the coefficients are 0.40 and 0.49, respectively, for female-headed households and all households when they face natural disaster). Similarly, households that belong to an ethnic minority group, households without the use right of agricultural land, households in the poorest wealth group, and those residing in the Red River Delta area also have less access to public safety net programs.

These results show a very worrisome situation existing in Vietnam’s safety net system. Not only does the system have limited resources, but also these scarce resources are poured into less-needy groups, thereby making the system even less effective.
Conclusions and Recommendations

The findings of this study show a good level of risk sharing taking place at the small-community (that is, commune) level in Vietnam, but adverse income shocks are not insured against at a regional or national level, thus indicating a shortage of effective national risk-pooling mechanisms. Even at a commune level, the existence of risk sharing explains only the performance of some preexisting self-insurance mechanisms among households with open flows of information, not formal risk-sharing mechanisms. It is reasonable to think that households within a commune cannot insure themselves against shocks that hit the whole commune at the same

Table 4.7. Multivariate Probit Estimates of Household Responses to Shocks

<table>
<thead>
<tr>
<th>Variable</th>
<th>Have support from safety net programs Coef.</th>
<th>Have positive net debt Coef.</th>
<th>Have positive net private transfer Coef.</th>
<th>Sold assets or withdrew savings over past 12 months Coef.</th>
<th>Household member got 2nd job Coef.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SE</td>
<td>SE</td>
<td>SE</td>
<td>SE</td>
<td>SE</td>
</tr>
<tr>
<td>HH member was unemployed</td>
<td>0.033</td>
<td>0.12</td>
<td>0.054</td>
<td>0.064</td>
<td>0.12*</td>
</tr>
<tr>
<td></td>
<td>(0.0009)</td>
<td></td>
<td>(0.0026)</td>
<td>(0.06)</td>
<td>(0.027)</td>
</tr>
<tr>
<td>HH member was ill or injured</td>
<td>0.00004</td>
<td>0.004</td>
<td>0.011**</td>
<td>0.002</td>
<td>0.0088**</td>
</tr>
<tr>
<td></td>
<td>(0.0000011)</td>
<td></td>
<td>(0.005)</td>
<td>(0.0022)</td>
<td>(0.0022)</td>
</tr>
<tr>
<td>HH faced a natural disaster</td>
<td>0.49**</td>
<td>0.11</td>
<td>0.19**</td>
<td>0.04</td>
<td>-0.25**</td>
</tr>
<tr>
<td></td>
<td>(0.0134)</td>
<td></td>
<td>(0.091)</td>
<td>(-0.063)</td>
<td>(-0.063)</td>
</tr>
</tbody>
</table>

Log likelihood: -10013.346
Number of observations: 4,300

<table>
<thead>
<tr>
<th>Variable</th>
<th>Have support from safety net programs Coef.</th>
<th>Have positive net debt Coef.</th>
<th>Have positive net private transfer Coef.</th>
<th>Sold assets or withdrew savings over past 12 months Coef.</th>
<th>Household member got 2nd job Coef.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SE</td>
<td>SE</td>
<td>SE</td>
<td>SE</td>
<td>SE</td>
</tr>
<tr>
<td>HH member was unemployed</td>
<td>0.049</td>
<td>0.13</td>
<td>0.009</td>
<td>0.065</td>
<td>0.26**</td>
</tr>
<tr>
<td></td>
<td>(0.001)</td>
<td></td>
<td>(0.0065)</td>
<td>(0.0065)</td>
<td>(0.0065)</td>
</tr>
<tr>
<td>HH member was ill or injured</td>
<td>-0.001</td>
<td>0.004</td>
<td>0.012**</td>
<td>0.002</td>
<td>0.0078*</td>
</tr>
<tr>
<td></td>
<td>(0.001)</td>
<td></td>
<td>(0.0004)</td>
<td>(0.0004)</td>
<td>(0.0004)</td>
</tr>
<tr>
<td>HH faced a natural disaster</td>
<td>0.53**</td>
<td>0.11</td>
<td>0.15**</td>
<td>0.04</td>
<td>-0.21**</td>
</tr>
<tr>
<td></td>
<td>(0.0134)</td>
<td></td>
<td>(0.091)</td>
<td>(0.091)</td>
<td>(0.091)</td>
</tr>
</tbody>
</table>

Log likelihood: -9877.0149
Number of observations: 4,300

Source: Author’s calculations.

Note: Coef. = coefficient; HH = household; SE = standard error. All the shock variables are included at the same time in the regression. Additional variables included but not reported are age and age-squared of head of household, a dummy variable to indicate if head of household is female, change in household size, change in total household labor hours, and region dummies. Figures in parentheses are marginal effects.

* $p < .10$.
* * $p < .05$.
** $p < .01$. 
time. A household in a commune can be insured when faced with a shock that hits only that household, but it seems to be largely exposed to aggregate commune risks.

The findings that regional-level risk-sharing mechanisms are lacking suggest that there is no mechanism to share risk across communes; that is, communewide shocks are completely uninsured. Therefore, despite the good results of risk sharing at the commune level, risks in Vietnam are not shared effectively and households are vulnerable to any kind of income risks that may affect a small community.

These situations suggest a need for effective formal government-run arrangements to reallocate and distribute resources across communes or across regions through social welfare programs.

Five findings about the identification of vulnerable households emerged from this study: (1) female-headed households are more vulnerable than male-headed households; (2) ethnic-minority households are more vulnerable than ethnic-majority ones; (3) households that own agricultural land are less vulnerable than households that do not own any land; (4) poor-income-decile households are more vulnerable than households in other wealth deciles; and (5) households in Red River Delta regions are most vulnerable, probably because of the more frequent floods and the high population density. After controlling for a household’s wealth level, the results still show that female-headed, ethnic-minority, and nonlandowning households are most vulnerable.

Table 4.8. Probability That Vulnerable Households Have Support from Public Safety Net

<table>
<thead>
<tr>
<th>Interaction between household has support from public safety and household characteristic</th>
<th>Variable</th>
<th>Coefficient</th>
<th>SE</th>
<th>Marginal effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>HH head is female</td>
<td>HH member was unemployed</td>
<td>–0.14</td>
<td>0.23</td>
<td>–0.07</td>
</tr>
<tr>
<td></td>
<td>HH member was ill or injured</td>
<td>0.0017</td>
<td>0.008</td>
<td>0.0001</td>
</tr>
<tr>
<td></td>
<td>HH faced a natural disaster</td>
<td>0.4*</td>
<td>0.17</td>
<td>0.022</td>
</tr>
<tr>
<td>HH belongs to ethnic minority group</td>
<td>HH member was unemployed</td>
<td>–0.16</td>
<td>0.23</td>
<td>–0.0028</td>
</tr>
<tr>
<td></td>
<td>HH member was ill or injured</td>
<td>–0.015*</td>
<td>0.008</td>
<td>–0.0003*</td>
</tr>
<tr>
<td></td>
<td>HH faced a natural disaster</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>HH does not have the use-right of land</td>
<td>HH member was unemployed</td>
<td>0.11</td>
<td>0.2</td>
<td>0.0016</td>
</tr>
<tr>
<td></td>
<td>HH member was ill or injured</td>
<td>–0.002</td>
<td>0.008</td>
<td>–0.000029</td>
</tr>
<tr>
<td></td>
<td>HH faced a natural disaster</td>
<td>–0.099</td>
<td>0.15</td>
<td>–0.0013</td>
</tr>
<tr>
<td>HH belongs to poorest wealth group</td>
<td>HH member was unemployed</td>
<td>0.036</td>
<td>0.12</td>
<td>0.0019</td>
</tr>
<tr>
<td></td>
<td>HH member was ill or injured</td>
<td>0.00013</td>
<td>0.004</td>
<td>6.90e-06</td>
</tr>
<tr>
<td></td>
<td>HH faced a natural disaster</td>
<td>0.49**</td>
<td>0.11</td>
<td>0.022*</td>
</tr>
<tr>
<td>HH resides in Red River Delta area</td>
<td>HH member was unemployed</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>HH member was ill or injured</td>
<td>0.006</td>
<td>0.014</td>
<td>3.14e-06</td>
</tr>
<tr>
<td></td>
<td>HH faced a natural disaster</td>
<td>–0.269</td>
<td>0.31</td>
<td>–0.00017</td>
</tr>
</tbody>
</table>

Source: Author’s calculations.

Note: — = not available; HH = household; SE = standard error. All the shock variables are included at the same time in the regression. Additional variables included but not reported are age and age-squared of head of household, a dummy variable to indicate if head of household is female, change in household size, change in total household labor hours, and region dummies.

+ p < .10.
* p < .05.
** p < .01.
The study offers evidence about the strategies that households adopt to cope with risk—mainly self-insurance strategies such as selling assets or borrowing from relatives and friends. But poor households cannot depend on these self-insurance strategies to insure themselves against income shocks because their assets are limited and they may fall much deeper into poverty. All households using self-insurance mechanisms, even the richer ones, may be less vulnerable at the moment but more vulnerable in the future. It is much better, therefore, if households have other arrangements to insure against risks.

The second coping device households use is credit—which suggests that the credit market performs well, although there are access obstacles for the poor who have little or no collateral to secure credit. Study results also show, however, that households have access to safety net programs only when they face natural disasters.

The analysis in this report suggests that the government’s safety net programs have made only negligible contributions to the favorable outcome of poverty reduction experienced in Vietnam over the period 1992–2002 and that the current safety net system fails to target the neediest groups. Although public spending is reported to have doubled over the period 1992–98, the government should reconsider and reevaluate the effective use of this spending to target poor and vulnerable households.

The current system suffers from the lack of national norms for consistently identifying the poor populations across regions; from the lack of survey and other instruments with which to measure and monitor local needs and program performance consistently; and from a lack of resources and attention to helping households and communities deal with covariate risk. This suggests the need for more compensatory mechanisms from the central government that could take the form of more money, better incentives for fiscal redistribution at the local level, and more monitoring of central norms or administrative constraints on local discretion in the implementation of centrally mandated social welfare programs. Also, there is a need to establish an insurance system for unemployed people who may become very vulnerable when left with no income. From the perspective of a safe society, this problem of unemployment not only puts people into poverty, but also creates more crime (which now is increasing in Vietnam).

Finally, the market economy arguably has increased the risks faced by households in Vietnam. Income from production and labor supply probably is more variable, whereas local risk-sharing arrangements appear to be poor. This situation may lead to costly behavioral responses to mitigate and reduce risk. Vietnam may well find it increasingly difficult to sustainably reduce poverty in the future without continuous efforts to provide more effective safety nets with effective risk-sharing mechanisms.

References


There are three main features that characterize Tanzania’s foreign trade: a persistent balance of trade deficit, the predominance of primary goods in the export basket and industrial goods in the import basket, and the bias toward the “North” in terms of import sourcing and export destination. Most imports are from the European Union, South Africa, Japan, North America (the United States), India, Kenya, and the United Arab Emirates. The main destinations for Tanzanian exports are almost the same—the European Union, India, South Africa, Japan, and Kenya. Tanzania’s quest for export development to increase its capacity to import and resolve the problem of trade deficits has been a subject of keen interest and concern for a long time. Various economic policies and strategies have been pursued since independence, all aimed at promoting exports. Those policies and strategies have involved exchange rates, tariff structures, export taxation, import control, currency devaluation, privatization of state-owned enterprises, trade liberalization, foreign exchange allocation systems, and the adjustment of policies to meet or adhere to international obligations and commitments. The Export Development Strategy initiative and the National Trade Policy also were adopted as ways of addressing the constraints against trade expansion. Tanzania has been exercising the above trade policy options in line with its international obligations, but the performance of the export sector has not been consistent with recommended policies and it has been outstripped by the increase in imports. Therefore, this study is aimed at identifying the root course of the trade deficit that has persisted in Tanzania since the 1970s. Results reveal that the main contributing factors are government expenditure, foreign direct investment, and private consumption. This report also addresses the policy instruments used to confront Tanzania’s trade deficit problems and suggested alternative policy options.

The growth and development of African economies in general and of Tanzania in particular have been influenced significantly by both the external trade environment and domestic policies geared toward using the opportunities of trade and responding to trade constraints. The domestic poli-
cies involved include exchange rates, tariff structures, export taxation, import control, foreign exchange allocation systems, and the adjustment of policies to meet or adhere to international obligations and commitments. The most important external factors are the prices of primary commodities, which for most economies have to be taken as givens. The application of trade policy instruments in Tanzania was guided by the need to stimulate domestic production, promote exports, safeguard domestic industry against dumping practices, and protect consumers. Tanzania has been exercising its trade policy options in line with its international obligations.

Over the decades of independence since 1961, Tanzania has pursued diverse economic policies culminating in major changes in trade policy with profound consequences for the expansion of trade and economic development. The trade regime in Tanzania can be divided into three parts. The first part was the pre-Arusha era (1967), which was a liberal period reflecting the relationships inherited from the colonial era. The private sector in this trade regime played the conventional role of economic agent and engine of growth. Foreign trade flows and relations rested on continued increased production of agricultural commodities and raw materials for export, largely in unprocessed form.

The second trade regime was the one under the Arusha Declaration, which was characterized by government intervention and control. The government adopted the policy of confinement in 1972 as one of the pillars for implementing the Arusha Declaration. The policy of confinement largely sought to place all major economic activities, comprising foreign and internal trade, under the control and management of the public sector. The government was then able to intervene in all operational aspects, using policy instruments like administrative resource allocation, price controls, import quotas, permits, and rationing to control the movement of goods and services. Trade policy was based on tariffs and quantitative restrictions, which were implemented to protect local infant industries against foreign competition and to finance the recurrent budget. Protectionism, however, had an undesirable effect on the performance of local industries because most of them were unable to produce efficiently enough to compete in the world market. The policy of trade confinement and its implications culminated in, among other things, the following problems:

1. Inefficient resource allocation and inability to mobilize adequate resources as a result of government intervention and controls on monetary policy
2. Decline in private sector activity and foreign direct investment (FDI) because of the nationalization of foreign and domestic investments and assets.

Furthermore, the limited internal capacity and the series of oil price shocks exacerbated the problem such that the local infant industries, so protected, failed even to meet local demands. These developments culminated in the emergence and prevalence of parallel markets in financial services and goods, with the larger proportion of transactions taking place in unofficial channels and a resultant worsening in the balance of payments and trade deficits. By the mid-1980s, the prevalence of controls in a situation of increasing shortages made change in trade policy imperative.

The third trade regime was trade liberalization and structural adjustment introduced following the failure of earlier restrictive policies to achieve the desired results. The Structural Adjustment Program was introduced in the early 1980s (fiscal 1982/83–1984/85), following severe macroeconomic imbalances that Tanzania had begun to experience—for example, a rising inflation rate, a falling real gross domestic product (GDP) growth rate, and widening fiscal and trade deficits. Liberalizing trade as an aspect of structural adjustment resulted in a few positive effects, such as reducing price distortions, and lowering budget and trade deficits. Structural adjustments, however, produced negative effects, such as a high social cost of unemployment, severe cuts in public expenditures for social services (particularly education and health care), and declines in investment. This economic depression induced a negative course of growth. Other
measures implemented during this third regime included devaluation of the Tanzania shilling (T Sh) and increased producer prices. The overall effect of trade liberalization measures and exchange rate adjustment was to increase economic activity. Nontraditional exports and some annual export crops, such as cotton and coffee, responded positively to the higher producer prices that resulted from devaluation. Official export earnings, however, did not increase significantly, partly because of difficulties in marketing agricultural exports and partly because of an increase in parallel markets and deteriorating terms of trade.

The formal introduction and implementation of the Economic Recovery Program between 1986 and 1992 helped extend the liberalization initiative to include widespread price decontrol and the removal of import restrictions. The program introduced a series of measures designed to establish a market economy based on free trade through a gradual introduction of policies that complement and facilitate effective functioning of trade policies.

By 1996, initiatives in these areas had not achieved the objective of reversing the general stagnation of trade flows. At the same time, the process of economic opening entailed a continuing systematic shift in the theme of trade policy away from the concept of internal trade based on a closed economy and toward a competitive system based on a market economy. The formation of the World Trade Organization (WTO) and the deepening process of globalization have added new impetus to the need for building a competitive market economy to withstand competitive pressures in the domestic market and support more effective participation in regional trading arrangements and in the multilateral trading system.

There were also other specific measures taken in the late 1990s toward promoting the export sector, including regional integration and a review of tariff rates. Privatizing publicly owned enterprises was another move taken by the government, primarily to improve efficiency in domestic production. The government offered several incentives to investors, including low tariffs on imports of raw materials, a low withholding tax rate, and credit facilities from financial institutions. High tax rates, however, were charged on the importation of finished goods.

Toward the early 2000s, there was a marginal improvement in the performance of exports, which indicates a partial recovery in the export sector. It also suggests the beginning of a diversification process in the structure of exports—from domination by traditional agricultural exports to such nontraditional exports as fish, minerals, and a few industrial products. As a result, the importance of agricultural commodities to Tanzanian exports overall is diminishing. For instance, the ratio of agricultural to total exports that averaged 84 percent in 1993 had fallen to 27 percent in 2002. This has culminated in an increase in the ability of export earnings to finance imports from about three months of imports in 1990 to about six months in 2002 (see table 5.1).

Tanzania’s quest for export development to increase its capacity to import and resolve the problem of trade deficits has been a subject of keen interest and concern for a long time. Constraints militating against the improvement of the country’s exports in spite of existing potentials include low production capacity, poor export development and promotion, technology-related problems, inadequate physical and economic infrastructure, and the consequences of marginalization in the context of globalization. To address the constraints against trade expansion, Tanzania embarked on a number of reforms, including the Export Development Strategy initiative and the National Trade Policy.

The Export Development Strategy report of June 1996 recommended strategies for developing the capacity to produce for the export market with the creation of market links. The recommendations included specific action plans in institutional and human capacity development, improvement of the legal and regulatory framework, and provision of better infrastructure.

To fast-track trade performance, the government adopted the National Trade Policy in 2003. Its objective is to enable Tanzania to identify ways and means of navigating a viable and steady route toward competitive export-led growth to achieve the country’s poverty reduction goal. Pursuing this policy conforms with international obligations and regional undertakings. The re-
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</tr>
</thead>
<tbody>
<tr>
<td>Imports (million T Shs)</td>
<td>2,274</td>
<td>5,710</td>
<td>14,959</td>
<td>161,502</td>
<td>392,665</td>
<td>531,742</td>
<td>666,258</td>
<td>770,778</td>
<td>702,441</td>
<td>907,494</td>
<td>1,061,363</td>
<td>1,018,438</td>
<td>1,100,458</td>
<td>1,207,131</td>
</tr>
<tr>
<td>Exports (million T Shs)</td>
<td>1,797</td>
<td>2,764</td>
<td>4,265</td>
<td>45,942</td>
<td>64,636</td>
<td>93,260</td>
<td>138,153</td>
<td>198,134</td>
<td>384,981</td>
<td>391,196</td>
<td>404,670</td>
<td>530,825</td>
<td>680,472</td>
<td>687,147</td>
</tr>
<tr>
<td>Agricultural exports (million T Shs)</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>77,988</td>
<td>105,042</td>
<td>171,788</td>
<td>253,060</td>
<td>238,714</td>
<td>225,900</td>
<td>234,240</td>
<td>203,280</td>
<td>185,180</td>
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<tr>
<td>Export/import (%)</td>
<td>79.0</td>
<td>48.4</td>
<td>28.5</td>
<td>28.4</td>
<td>16.5</td>
<td>17.5</td>
<td>20.7</td>
<td>25.7</td>
<td>54.8</td>
<td>43.1</td>
<td>38.1</td>
<td>52.1</td>
<td>61.8</td>
<td>56.9</td>
</tr>
<tr>
<td>Agricultural/total exports (%)</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>83.6</td>
<td>76.0</td>
<td>86.7</td>
<td>65.7</td>
<td>61.0</td>
<td>55.8</td>
<td>44.1</td>
<td>29.9</td>
<td>26.9</td>
</tr>
</tbody>
</table>


*Note:* n.a. = not applicable; T Sh = Tanzanian shilling.
forms made in the early 2000s contributed to the increase in exports, but unfortunately imports were increasing as well and made the trade balance generally unfavorable (see figure 5.1).

**Statement of the Problem to Be Studied**

Despite Tanzania having undertaken macroeconomic reforms and adopted various policies and strategies with respect to external trade, performance of the export sector has not been consistent with recommended policies and has been outstripped by the increase in imports. According to the available statistics, Tanzania has never experienced a trade surplus since the 1970s. There have been increasing balance of trade deficits, which cause a serious lack of foreign exchange to meet the import bill and other payment obligations, such as external debt. This deficit raises suspicions that there could be certain policy variables that have led to the deteriorating trends of the balance of trade. This study, therefore, tries to test empirically the relationship between Tanzania’s trade balance and its determinant variables, which are considered to be the root causes of the trade deficit.

**Research Objective, Study Significance, and Scope**

The purpose of this study is to explore major factors that influenced the trade balance in Tanzania from 1970 to 2002. The findings not only will add knowledge to the existing literature, but also will be useful to policy makers in formulating relevant policies that benefit the business community and the nation as a whole. Furthermore, the findings will give some important insights about measures to be taken to improve competitiveness in the world market and hence narrow or remove the trade deficit problems that have prevailed in Tanzania since the early 1970s.

Many reports have defined international trade as involving cross-border movement of goods, services, and factors of production such as capital and labor. This study covers only merchandise trade because it was difficult to get relevant information on trade in services. The period covered is from 1970 to 2002, when data on merchandise trade were available. There are many and diverse qualitative and quantitative factors that may influence a nation’s trade balance. For the purpose of this study, variables investigated involved government expenditure, household consumption, real exchange rate, foreign direct investment, and income from the rest...
of the world. Trade liberalization was also used as a dummy variable to capture its impact on the trade balance before and after 1993.

**Trade and Economic Overview**

Trade is defined as the exchange of goods and services between individuals or corporate entities within a country or between nations. Traditionally, international trade has been understood as involving only the movement of goods and services across national borders, but it also covers cross-border transactions of factors of production. It also has been observed in the past that most trade policy has placed emphasis on trade in merchandise, with the role of services largely confined to the facilitating aspect. The term *services* covers a wide range of economic activities, such as tourism and travel, educational, recreational, financial, and consultancy services. The emerging importance of trade in services is the result of increasing appreciation for the concept of services as a tradable good, apart from its role in assisting economic activity.

Three main features characterize Tanzania’s foreign trade. Those include a persistent balance of trade deficit, the predominance of primary goods in the export basket and industrial goods in the import basket, and a bias toward the “North” in terms of import sourcing and export destination. Tanzania’s trading partners have not changed in a long time. Most imports for the years 1991, 1998, and 2002 came from the European Union and Japan. The United States, South Africa, and Kenya also were important sources of imports, as were China, India, Thailand, and the United Arab Emirates. The main destinations for Tanzanian exports in 1991, 1998, and 2002 were the European Union and India. Other destinations included South Africa, Japan, and Kenya (see figure 5.2).

*Trends in World Trade and the Place of Sub-Saharan Africa*

Analysis of world trade categorized by major economic areas indicates that the industrial countries dominate world trade. Developing countries in total account for less than 30 percent of world trade.

![Figure 5.2. Tanzania’s Trade with Partners, 1997–2005](image)

*Source:* Abridged from tables 5A.2 and 5A.3.

*Note:* EU = European Union; SADC = Southern African Development Community; UAE = United Arab Emirates.
trade, with the smallest 150 trading countries accounting for less than 15 percent. Over the 20 years from 1982 to 2002, sub-Saharan Africa’s share of world trade (excluding that of South Africa) has declined from 5 percent to around 2 percent. Countries in sub-Saharan Africa continue to trade in primary commodities, mainly agricultural and mining products. The fundamental cause for their poor performance is the failure to share in the increase in trade in manufactured goods. The share of these countries in world manufacturing output declined from 0.6 percent in the 1970s to 0.3 percent by 1995. The growing importance of trade in services, particularly tourism, offers new opportunities to reverse the trend of a declining world trade share for sub-Saharan Africa.

**Trade Performance in Tanzania**

The share of Tanzania’s exports in world trade has been on the decline. The nation maintained a surplus balance of trade up to 1969, but has experienced a widening trade deficit since then. Import demand increasingly has been financed through external borrowing and assistance. Between 1979 and 1995, export earnings were barely adequate to meet a third of imports. Export earnings from the three major crops—coffee, cotton, and tobacco—peaked in 1996, following the implementation of trade liberalization measures and increases in both volumes and prices, among other things. However, starting in 1997, there has been a resumption of the downward trend in terms of output volume and earnings.

**Exports.** The economy of Tanzania depends to a large extent on agriculture, which accounted for about 50 percent of its total GDP and an average of 50 percent of export earnings between 1982 and 2002. These primary goods, however, face unfavorable terms of trade in the world market. In addition to the three crops cited above, the major agricultural exports from Tanzania are cashew nuts, sisal, and tea. As Ndulu and Lipumba (1990) put it, Tanzania export growth has been predominantly supply constrained. This means that the drop in real export earnings can be explained by factors affecting the production of export commodities rather than by a decline in world market prices. This observation is paramount to understanding Tanzania’s export performance. In 1993, for instance, agricultural exports accounted for around 84 percent of total exports, and they declined to 27 percent in 2002. Industrial exports have been on the rise following adoption of trade liberalization and the privatization of public enterprises. Exports of minerals alone accounted for about 42 percent of total exports in 2002, compared with only 8 percent in 1993 (see table 5.2 and figure 5.3).

**Table 5.2. Export Earnings by Major Products, 1995–2002**

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<tbody>
<tr>
<td>Coffee</td>
<td>142.6</td>
<td>136.1</td>
<td>119.3</td>
<td>108.7</td>
<td>76.6</td>
<td>83.7</td>
<td>57.1</td>
<td>34.2</td>
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<tr>
<td>Cotton</td>
<td>120.2</td>
<td>125.3</td>
<td>130.4</td>
<td>47.6</td>
<td>28.3</td>
<td>38.0</td>
<td>33.7</td>
<td>36.5</td>
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<tr>
<td>Sisal</td>
<td>6.3</td>
<td>5.3</td>
<td>9.1</td>
<td>6.8</td>
<td>7.3</td>
<td>5.6</td>
<td>6.7</td>
<td>7.7</td>
</tr>
<tr>
<td>Tea</td>
<td>23.4</td>
<td>22.5</td>
<td>31.8</td>
<td>30.4</td>
<td>24.4</td>
<td>32.7</td>
<td>29.0</td>
<td>29.8</td>
</tr>
<tr>
<td>Tobacco</td>
<td>27.1</td>
<td>49.2</td>
<td>53.6</td>
<td>55.4</td>
<td>43.4</td>
<td>38.4</td>
<td>35.7</td>
<td>55.3</td>
</tr>
<tr>
<td>Cashew nuts</td>
<td>64.0</td>
<td>97.8</td>
<td>91.1</td>
<td>107.3</td>
<td>98.9</td>
<td>84.4</td>
<td>56.6</td>
<td>57.5</td>
</tr>
<tr>
<td>Petroleum products</td>
<td>11.0</td>
<td>15.8</td>
<td>7.1</td>
<td>0.1</td>
<td>0.5</td>
<td>0.0</td>
<td>0.0</td>
<td>2.1</td>
</tr>
<tr>
<td>Manufactures</td>
<td>109.3</td>
<td>122.8</td>
<td>111.3</td>
<td>35.7</td>
<td>32.3</td>
<td>43.1</td>
<td>56.2</td>
<td>64.7</td>
</tr>
<tr>
<td>Minerals</td>
<td>44.9</td>
<td>55.9</td>
<td>51.1</td>
<td>26.4</td>
<td>71.6</td>
<td>177.4</td>
<td>302.2</td>
<td>373.7</td>
</tr>
<tr>
<td>Others</td>
<td>134.3</td>
<td>133.0</td>
<td>147.7</td>
<td>170.1</td>
<td>157.8</td>
<td>159.9</td>
<td>199.3</td>
<td>218.3</td>
</tr>
<tr>
<td>Total</td>
<td>682.9</td>
<td>763.8</td>
<td>752.6</td>
<td>588.5</td>
<td>541</td>
<td>663.2</td>
<td>776.4</td>
<td>879.7</td>
</tr>
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</table>

*Source: United Republic of Tanzania, Economic Survey, various issues.*
**Imports.** On average, capital goods accounted for 41 percent of the total import bill, intermediate goods for 29 percent, and consumer goods for 30 percent between 1986 and 2002. The reasons for the dominance of capital goods in the import bills, especially in the 1990s, are the large inflows of FDI, particularly to the mining sector, and the implementation of major government projects such as road construction. Many industries in Tanzania depend largely on imported raw materials. The economy lacks the relevant interindustry links to make industrial productivity more meaningful and profitable. Big chunks of foreign currency are used for the purchases of those industrial inputs. Production also is characterized by low technological input and high unit cost relative to their rivals abroad. As such, many Tanzanian industries find it difficult to compete efficiently in the foreign markets.

**Regional and International Cooperation**

As a means to create larger markets and increase trade flow, Tanzania is a member of two regional groupings—namely, the East African Community (EAC), and the Southern African Development Community (SADC). The EAC is a community of three partner-states—Kenya, Tanzania, and Uganda. The EAC aims at strengthening the economic integration of these countries on a selective and sensible basis, including facilitation of trade through harmonization of tariffs, payments, transport, movement of people, and harmonization of other areas of common interest. The underlying objectives of the EAC are to foster mutually beneficial trade developments and closer socioeconomic and political cooperation. The challenge to Tanzania in the EAC context is its trade imbalance with Kenya, which is the net exporter among the three partner-states. Table 5.3 shows the status of intraregional trade in the EAC.

**Table 5.3. Tanzania's Share of Trade with Its EAC Partners, 1994–2000**

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</thead>
<tbody>
<tr>
<td>Exports to Kenya</td>
<td>1.9</td>
<td>1.8</td>
<td>1.8</td>
<td>1.7</td>
<td>3.3</td>
<td>3.8</td>
<td>3.9</td>
</tr>
<tr>
<td>Exports to Uganda</td>
<td>1.5</td>
<td>1.4</td>
<td>1.6</td>
<td>1.5</td>
<td>1.1</td>
<td>0.8</td>
<td>1.2</td>
</tr>
<tr>
<td>Imports from Kenya</td>
<td>7.4</td>
<td>8.9</td>
<td>11.6</td>
<td>7.2</td>
<td>6.7</td>
<td>5.8</td>
<td>6.0</td>
</tr>
<tr>
<td>Imports from Uganda</td>
<td>—</td>
<td>—</td>
<td>0.56</td>
<td>0.62</td>
<td>0.37</td>
<td>0.37</td>
<td>0.31</td>
</tr>
</tbody>
</table>

*Source: EAC 2002.*

*Note: — = not available.*
Tanzania’s participation in the EAC offers immense opportunities for economic growth and development. The country’s strength emanates from its vast natural resources, including large areas of arable land, mineral deposits, and a strategic position as a littoral state with access to the sea. These resources, however, have not been harnessed substantially. Apart from having natural resources, the country has been able to sustain a high degree of political stability and peace. These resources and advantages accord Tanzania potential opportunities in regional trade arrangements that can be used to reduce the trade deficit and reverse trade imbalances with leading trading partners.

Tanzania’s membership in SADC occurred after the group’s establishment in the early 1980s. The SADC is a community of 13 member-states that recently have ratified the Trade Protocol aimed at establishing a free trade area for the liberalization of intra-SADC trade in goods and services, and the adoption of relevant trade laws (antidumping, subsidies, countervailing duties, and safeguard measures).

Tanzania also is committed in other bilateral and multilateral arrangements (like those within the WTO; the African, Caribbean, and Pacific Group of States; the African Growth and Opportunity Act; and the European Union). Tanzania, however, has not benefited much from these regional and international cooperations as far as exports are concerned. It seems as though Tanzania is a marketplace for goods from other countries, but there is little reciprocity.

Liberalization and Globalization

Tanzania’s economic takeoff, more than ever before, depends on how the country makes use of opportunities presented by trade liberalization and globalization. Liberalization has meant a gradual lifting of restrictions on trade through removal of nontariff barriers and the reduction of tariffs. The main challenge facing Tanzania is how to enhance the competitiveness of domestic firms and entrepreneurs because liberalization alone cannot solve this problem.

Globalization refers both to the increasing flow of goods, assets, and resources across national borders and to the emergence of a complementary set of organizational structures to manage the expanding network of international economic activity and transactions. A global economy is one where firms and financial institutions operate beyond the confines of national borders. In a global economy, goods, factors of production, and financial assets almost flow freely. Globalization entails the merging of Tanzania’s domestic markets into the global market, and the country’s major challenge is how to participate effectively and gainfully in the emerging global market. Globalization requires dynamic policies and strategies aimed at exploiting inherent opportunities. It is beneficial in terms of trade development through enhanced access to the world market and the opportunity to convert current comparative advantages into new sources of competitiveness based on the free flow of investment resources, factors of production, assets, and information.

Although liberalization and globalization present daunting challenges to Tanzania, they also provide opportunities for increasing its share in world trade. Both impose constraints that inhibit available domestic capacity to compete with the external sector. So far, Tanzania has not been able to derive substantive benefits from globalization and trade liberalization because of inadequate supply and delivery capacity characterized by low technology, inadequate physical and human capital, and underdeveloped infrastructure. The main challenge therefore is to address the constraints limiting Tanzania’s meaningful participation and integration into the global economy.

Literature Review

In carrying out the research on the factors affecting trade balance in Tanzania, I reviewed relevant empirical studies of related work and theoretical literature to link this study with what has

1. SADC member-countries are Angola, Botswana, Democratic Republic of Congo, Lesotho, Malawi, Mauritius, Mozambique, Namibia, South Africa, Swaziland, Tanzania, Zambia, and Zimbabwe.
been documented. Empirical studies reveal how different methodologies and data sets in various environments have been used to yield the results that might be of great importance to this study. To understand the trade deficit and the causes of changes in the balance of trade, it is important to have a broader view of what has been done in related studies elsewhere.

Generally, many researchers agree (and have found empirically) that the variables in question (listed above in the discussion of study scope) have an impact on a country’s trade balance. The literature suggests that the internal and external factors that influence an economy’s trade balance vary from country to country and from time to time. As a result, their influences on the trade balance also vary significantly. A full account of such factors requires a detailed country analysis. It therefore is important to establish an empirical relationship between Tanzania’s trade balance and its determinants.

Methodology

This section of the report covers the methodology used in carrying out this research, including discussion of the data types and sources, model specification, explanation of variables, and the hypotheses to be tested.

Data Types and Sources

This study has relied on secondary time-series data concerning the trade balance (defined as the ratio of imports to exports), household consumption expenditure, government expenditure, FDI, the real exchange rate (proxied from nominal exchange rates), and income from the rest of the world. Secondary data were obtained from various sources. Income from the rest of the world was obtained from World Economic Outlook (IMF 2002). FDI data were taken from the 2001 report by the United Nations Conference on Trade and Development (UNCTAD). Data on household consumption, government expenditure, nominal exchange rates, and the consumer price index were derived from International Financial Statistics (IMF 2001) and from Tanzania’s Economic Survey (United Republic of Tanzania 2002). Producer price index data are from the Organisation for Economic Co-operation and Development (OECD 2001). Import and export data were derived from various issues of Tanzania’s Economic Survey.

Model Specification

A country’s trade balance can be expressed in reduced form as follows:

\[ TB = f(RER, HC, G, Y_w, FDI). \]  

(5.1)

To run the regression analysis from the above function, Tanzania’s trade balance model can be expressed as

\[
\log TB_t = \alpha_0 + \alpha_1 \log RER_t + \alpha_2 \log HC_t + \alpha_3 \log G_t + \alpha_4 \log FDI_t + \alpha_5 \log Y_t + \alpha_6 \log DM_t + E_t,
\]  

(5.2)

where \( TB_t \) is the trade balance, taken as the ratio of import to export; \( RER_t \) is the real exchange rate at time \( t \); \( HC_t \) is household consumption expenditure at time \( t \) (including net private investment); \( G_t \) is government expenditure at time \( t \); \( FDI_t \) is foreign direct investment at time \( t \), in U.S. dollars; \( Y \) is aggregated income from the rest of the world, calculated on the basis of Tanzania’s five major trading partners that account for the largest shares of its trade (India, Japan, Kenya, South Africa, and the United States); \( DM_t \) is the dummy variable capturing the effect of trade liberalization undertaken in Tanzania in 1993; and \( E_t \) is the error term capturing unexplained factors in the trade balance.
Hypotheses

Based on the stated problem, the study objective, and the literature review, the following hypotheses will be tested:

1. The real exchange rate positively affects the trade balance.
2. Private consumption has a negative impact on the trade balance.
3. Government expenditure is negatively related to the trade balance.
4. FDI positively affects the trade balance.
5. Real income to the rest of the world has a positive impact on the trade balance.
6. Trade policy reforms positively affect the trade balance.

Explanation of the Variables

Trade balance measures the relationship between a country’s exports to the rest of the world and its imports from the rest of the world. It is closely linked to financial flows between countries. It is the dependent variable in the model.

A rise in the real exchange rate (RER) indicates a real depreciation. In such a situation, foreign goods become more expensive than domestic goods. This also will lead to an increase in competitiveness of exports and a shift of resources from sectors that produce nontradables to those producing tradable goods. This means that exports will rise relative to imports and hence trade balance will improve. A fall in RER (real appreciation) will lead to an increase in the cost of production, thereby depicting a deterioration in the country’s degree of international competitiveness (that is, the country produces in a way that is less efficient than it used to be). These explanations lead us to expect that RER will affect the trade balance positively, but that depends on the ability of the country to manipulate the exchange rate, given the level of foreign reserves.

One of the causes of the trade deficits is the increase in household consumption. Economic growth of a country may result in a significant growth in citizens’ standard of living. As a result, the country may be able to sustain a very high level of consumption, which has to be met, in part, by higher imports if the nation cannot produce enough to meet local demand. In other words, if the nation experiences sustained improvement in living standards, this will enable the country’s businesses and households to consume more; and if the nation cannot produce enough to meet local demand, more will be imported—thus widening the trade deficit. In this pursuit, household consumption will be a negative function of the trade balance.

Government expenditure has the same effect as household consumption, except that government may increase consumption whether the economy is growing or not. The effect is that, if the government imports more than it exports—as always has been the case for developing countries—then the trade balance will widen. Government expenditures therefore have a negative impact on the trade balance.

Depending on the extent to which foreign direct investment is concentrated in tradable sectors and on the import content of the associated domestic production, the impact of FDI on the trade balance may be positive or negative. For a developing nation like Tanzania, most of the capital equipment and intermediate products are imported by transnational companies from overseas affiliates and they take out foreign exchange in the form of repatriated profits, salary, and interest on loans. The short-run net effect of FDI on the trade balance under such circumstances most likely will be negative because of the production lag. In the long run, however, it is assumed that the net effect will be positive because export production from transnational corporations is expected to rise.

Income from the rest of the world is the total national income at factor cost. It has a positive impact on the trade balance. The underlying assumption is that when the income of Tanzania’s trading partners increases, they would “import” more from Tanzania.
*Dummy variable* was used to capture the effect of trade liberalization. Under a situation of import control, a country may be able to check on the balance of trade. When there is a trade balance deficit, the country can reduce imports. However, when the economy is liberalized, there are no more restrictions on the volume of imports or exports. The trade balance therefore will depend on the volume of exports and imports, which is determined by market forces. It can either be negative or positive, depending on whether the economy has been able to produce efficiently after liberalization. It will depend also on the efficiency of the government in regulating and monitoring trade-related polices.

**Empirical Analysis**

Economic theory requires variables in regression analysis to be stationary. Granger and Newbold (1974) have shown that ordinary least squares (OLS) estimators can be inconsistent when economic time-series are not stationary and consistent with the assumptions of the linear regression model (LRM). Although OLS estimation results in high $R^2$ and significant t-statistics, inferences based on traditional statistical tests could be misleading. For modeling purposes, I tested the stationarity of the time-series before conducting regression analysis. I also tested whether the assumptions of the LRM have been violated and corrected them accordingly. After all tests and corrections, OLS was run and the results are discussed hereunder.

**Diagnostic Tests**

A number of diagnostic tests were carried out to clarify and determine the authenticity of the data used. Such tests included the tests for autocorrelation, heteroskedasticity, stationarity of the data, and investigation of the order of integration of each variable using the augmented Dickey-Fuller test. The results were found to be satisfactory with minor adjustments. For instance, I concluded empirically that there is no heteroskedasticity. This means that there is no significant relationship between the independent variables, any of their squares, and cross terms with the error term.

**Discussion of the Results**

Having completed all the requisite tests and corrections where appropriate, I applied OLS to the model to run the regression. The results found are discussed below, first looking at the overall observations and then critically analyzing the result of each variable in the model.

**General Observations**

The result of the regression analysis (OLS) from equation (5.2) is as follows:

$$LG_{tb} = 0.46 \hat{G} - 0.34 \hat{HC} + 0.0079 \hat{FD} + 0.247 \hat{Y} - 0.13 \hat{RER} - 0.467 \hat{DM} - 2.84$$

$$a_i$$

$$(0.197) (0.16) (0.059) (0.307) (0.21) (0.173) (4.45)$$

The figures in parentheses are the standard errors. $R^2 = 0.77$, F-statistic (6, 26) is 14.59.

The general fit of the model was found to be satisfactory with an $R^2$ of 77 percent. This implies that up to 77 percent of the change in the trade balance in Tanzania is explained adequately by changes in the factors captured by the model. The estimated F-value is also high, at 14.59. This value is greater than the standard F-statistic, which confirms that the model has some explanatory power.
Individual Parameters

The test for individual parameter is carried out as follows:

\[ H_0: \alpha_j = 0 \]
\[ H_A: \alpha_j \neq 0 \]
\[ t_{av} = t_{0.05,26} \]

with \( t_c \) as the calculated \( t \)-statistic, and \( t_s \) as the standard \( t \)-statistic from the standard regression tables (see table 5.4). Decision rule is “REJECT Iff” \( |t_c| > t_s \). This means that the parameter under consideration is significantly different from zero.

According to table 5.4, three variables (household consumption, government expenditure, and dummy) are statistically significant in explaining the imbalances of the trade situation in Tanzania. The detailed analysis of each variable is given below, with reference to table 5.4.

Analyzing the estimated results above, private consumption and government expenditure are the main variables that cause the trade deficit. Household consumption is statistically significant at 5 percent. These results show that a 1.00 percent increase in household consumption will result in a 0.34 percent worsening of the trade balance. Such a result for Tanzania is correct and is strongly supported by the high import content of commodities found on the consumer shelf in Tanzania—cars, petroleum products, second-hand clothes, electronic equipment, and so forth. This is true because there are very few goods produced locally, compared with local demand. Total demand is fulfilled largely by imported consumer goods. Even the few locally produced goods that are available don’t meet the qualities preferred by local consumers, so there is a lot of substitution of imported goods for locally produced ones. That substitution continues to worsen the trade balance.

Government expenditure, on the other hand, has indicated a positive relationship, but it is significant at the 5 percent level. A 1.00 percent increase in government expenditure would lead to an improvement of the trade balance by 0.46 percent. According to the theoretical literature of Taylor (1993), this result simply means that there have been sensible government interventions, such as investment in productive sectors, undertaken to promote exports. The result supports government expenditure, but such expenses should really address the underlying challenges, such as infrastructure and human resource development. However, there is also a need to reduce government expenditure, especially in nonpriority areas (cars and/or military expenditures). Note also that reducing government expenditure may not be a sensible solution if it entails reducing expenditures in such priority sectors as health care, education, agriculture, and the like.

Table 5.4. Summary of Parameter Results

| Variable | Parameter | \( |t| \)-Statistic | p-Value | \( t \)-Standard | Level of significance | Decision |
|----------|-----------|-------------------|---------|----------------|----------------------|----------|
| LGFDI    | \( \alpha_4 \) | 0.13              | 0.895   | 1.706          | 0.05                 | Accept \( H_0 \) |
| LGG      | \( \alpha_3 \) | 2.38              | 0.025   | 1.706          | 0.05                 | Reject \( H_0 \) |
| LGHC     | \( \alpha_2 \) | 2.12              | 0.044   | 1.706          | 0.05                 | Reject \( H_0 \) |
| LGRER    | \( \alpha_1 \) | 0.62              | 0.543   | 1.706          | 0.05                 | Accept \( H_0 \) |
| LGY      | \( \alpha_5 \) | 0.80              | 0.428   | 1.706          | 0.05                 | Accept \( H_0 \) |
| Dummy    | \( \alpha_6 \) | 2.70              | 0.012   | 1.706          | 0.05                 | Reject \( H_0 \) |
| C        | \( \alpha_0 \) | 0.64              | 0.530   | 1.706          | 0.05                 | Accept \( H_0 \) |

Source: Author’s calculations.

Note: \( LG \) indicates the logarithmic form of the variable; \( C \) = constant; \( FDI \) = foreign direct investment; \( G \) = government consumption expenditure; \( HC \) = household consumption expenditure (including net private investment); \( RER \) = real exchange rate; and \( Y \) = income to the rest of the world.
RER has not indicated the expected sign. However, its effect is insignificant as shown by the t-statistic. Contrary to the hypothesis, a 1.00 percent increase in real exchange rate results in a 0.13 percent worsening of the trade balance. Thus, currency devaluation in a situation of foreign currency scarcity and substandard export thus is not a feasible solution for promoting exports. Devaluation can work only in developed countries where their exports demand is inelastic (Shirvani and Wilbratte 1997). In developing countries like Tanzania, what is more important is to improve the quality of exports such that they will compete in the world market not only in terms of price, but also in terms of quality. There is a need to improve production technology, but devaluation alone cannot enable a country to sell more in the world market, even if the products are of low quality. Although the result was unexpected, this reflects the reality about the nature of the export product—agricultural crops—which face deteriorating terms of trade.

Income to the rest of the world has shown a positive sign, as expected, at the 5 percent level of significance. A 1.00 percent increase in the income of the rest of the world will result in a 0.25 percent improvement in Tanzania’s trade balance. This finding suggests that Tanzania needs to improve productivity and efficiency so as to meet the standards of foreign demand. The impact of the change in foreign income on Tanzania’s trade balance, however, is insignificant at the 5 percent level. Going by the reality of the trade relationship between developed and least developed countries, this result is particularly true, as was revealed in the 2003 WTO meeting in Mexico. Developed countries have shown disinterest in the goods from developing countries and are helping their own local producers (particularly in the agriculture sector) through subsidies so that they out-compete agriculture products from least developed countries in terms of price and probably quality. There was thus no equity in trade relations under the framework of the WTO because developed countries were too defensive and protective in their trade negotiations.

FDI has indicated a positive relationship, as hypothesized. A 10.0-unit increase of FDI will result in an 0.8-unit improvement in the trade balance. The impact, however, is not very significant because much of the so-called FDI currently in Tanzania is in the form of imported capital equipment, and not much has been produced for export so far.

Trade liberalization has indicated an unexpected negative sign. However, it is significant at the 5 percent level. This means that trade liberalization had played an important role in influencing the trade balance in Tanzania. The result shows that the deficit is worsened by 0.47 percent when the country introduces trade liberalization. This result is consistent with the UNC-TAD study, which indicated that trade liberalization introduced after a long period of import compression often leads to an increase in the demand for foreign goods. By looking at the real situation in Tanzania, we see that this assertion is true because there was a strong influx of consumer goods (second-hand clothes, cars, televisions, radios, and so forth) after trade liberalization in the early 1990s. Importation of capital and intermediate goods also increased following the initiative by the Tanzania Investment Center to attract FDI. There is evidence to suggest that policy reforms during the 1990s may have attracted the additional influx of private capital, as shown by the increase in investments approved by the Investment Center from US$47.3 million in 1990 to US$1,024 million by the year 2002. Additionally, the increase in FDI from US$11 million in 1998 to US$472 million in 2002 reinforces the belief that investors responded favorably to policy changes that took place during the 1990s.

The constant is insignificant at the 5 percent level, which implies that the model had captured many of the factors influencing the trade balance. When all variables used in this model are zero, there will be a trade deficit of 2.84 units. This is attributed to the fact that Tanzania has experienced perpetual trade deficits since the 1970s.

**Conclusion and Policy Recommendations**

The purpose of this report has been to present the Tanzanian experience with trade deficits and to identify the main contributions of the policy instruments that were used to confront the prob-
In terms of policy instruments used, it should be noted that the instruments have attracted more imports (capital inflows), but that domestic capacity to produce for export is inadequate.

The report also has aimed at determining the root course of trade deficits that have persisted in Tanzania since the 1970s. In the case of Tanzania, I have found that the main contributing factors are government expenditure, FDI, and private consumption.

Based on the findings of this study, I recommend the following actions to address the trade imbalance:

1. **Raise tariffs on imported final goods.** This study has revealed that Tanzanians simply are spending more on foreign goods than they are producing, and foreigners are spending less. This condition cannot be sustained. Reducing the trade deficit requires that we reduce either private or government consumption by discouraging import of certain categories of goods and, at the same time, creating an enabling environment for increasing domestic production.

2. **Increase savings to finance domestic investment.** To reduce the trade deficit, the country must increase the savings needed to finance domestic investment, which would then improve the industrial base. Different ways of doing that, however, would have greatly different effects on the economy. Reducing government spending would reduce the services and transfer payments for education and health care that are available to the citizens. An increase in personal taxes would reduce private consumption, saving, and investment. An increase in the tax on business investment would reduce the future growth of real wages and consumption. Therefore, Tanzania should consider the opportunity cost forgone in the choice to be made among these measures.

3. **Improve domestic production capacity.** This study has discovered that most resources (human and material) used by foreign investors are imported, even if they are available locally. This occurs because of the low quality of the available resources and the country’s poor infrastructure, so improving infrastructure and developing the country’s human resources is needed to correct this situation. Doing so will enable foreign investors to import fewer resources (inputs), so the government will be able to take full advantage of the FDI.

4. **Properly manage the exchange rate.** The intuition of most policy makers is that a rising trade deficit or current account deficit is bad, whereas surpluses are good. This intuition is a poor guide to policy. First, it ignores the distinction between a rising trade balance deficit associated with a stronger currency and rising investment opportunities in the country and a rising trade deficit accompanied by a depreciation of local currency. For strong economies like that of the United States, market forces can operate on their own and produce self-correcting forces that operate on the country’s trade balance. For developing countries like Tanzania, such self-correcting mechanisms cannot work. The most appropriate way to control the Tanzanian trade balance is to combine liberalization with proper management of the exchange rate. Such management is considerably more important than import policy for successful exporting and sustained growth. A stable exchange rate would enable producers of tradables to make long-term investment plans. Proper management, however, will require having enough foreign reserves to hedge against exchange rate fluctuations.

5. **Select and apply appropriate trade policy instruments.** The results show that trade policy (liberalization) played a significant role in influencing the trade balance in Tanzania. To address the problem constraining trade expansion and growth in Tanzania, it is necessary that the choice of suitable policy instruments reflects the most direct relationship between issues involved in the identified constraint and the instruments available. Trade policy implementation has to prioritize the application of instruments to address specific problems on the basis of anticipated direct impact. Effective trade policy also depends on adopting a common direction for different instruments so that these instruments complement rather than contradict each other.
Suggestions for Further Research

The existing literature has revealed several variables that influence trade balances. I have been able to capture some of them in the Tanzanian context, but I could not capture others. Variables like terms of trade and capacity to produce for export are very important in explaining the variability of the trade balance. Previous studies for a developing economy, for instance, have found a negative relationship between trade balance and terms of trade, but a lack of consistent and reliable data on terms of trade kept me from capturing its effect on trade balance. If enough reliable information can be obtained about these variables, integrating them with the other variables would be interesting work. Trade in services is another important area that needs further research because it is now the booming industry in the majority of least developed countries.
Table 5A.1. Study Data Set

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<th>MP</th>
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Source: Author's information.

Note: CPI = consumer price index; DM = dummy variable; FDI = foreign direct investment, in US$ millions; G = government consumption expenditure at current prices, in millions of Tanzanian shillings (T Shs); HC = household consumption expenditure (including net private investment) at current prices, in T Sh millions; MP = imports, in T Sh millions; NER = nominal exchange rate used to compute real exchange rate as (NER * producer price index)/consumer price index; PPIUS = producer price index in the United States; TB = trade balance computed as the ratio of imports to exports; XP = exports, in T Sh millions; Y = income to the rest of the world, in US$ millions. In the DM column, 0 = before trade liberalization.
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Note: — = not available; EAC = East African Community; p = provisional data; SADC = Southern African Development Community.
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<td>95.2</td>
<td>115.9</td>
<td>130.1</td>
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<td>5.6</td>
<td>11.4</td>
<td>2.7</td>
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<td>Subtotal (EAC)</td>
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<td>108.1</td>
<td>101.1</td>
<td>99.0</td>
<td>107.5</td>
<td>97.9</td>
<td>124.1</td>
<td>137.7</td>
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<td>0.2</td>
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<td>22.3</td>
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<td>12.5</td>
<td>16.7</td>
<td>26.7</td>
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<td>23.2</td>
<td>17.7</td>
<td>19.6</td>
<td>35.3</td>
<td>223.7</td>
<td>1.3</td>
<td></td>
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<td>United States</td>
<td>52.6</td>
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<td>58.9</td>
<td>65.3</td>
<td>91.4</td>
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<td>78.1</td>
<td>99.9</td>
<td>696.5</td>
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<tr>
<td></td>
<td>Other North American countries</td>
<td>15.5</td>
<td>38.9</td>
<td>37.9</td>
<td>24.5</td>
<td>7.9</td>
<td>13.7</td>
<td>32.9</td>
<td>32.6</td>
<td>46.7</td>
<td>250.6</td>
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<td>Total, North America</td>
<td>80.6</td>
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<td>163.9</td>
<td>115.7</td>
<td>96.4</td>
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<td>China</td>
<td>61.5</td>
<td>48.8</td>
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<td>68</td>
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<td>171.4</td>
<td>217.4</td>
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<td>732.1</td>
<td>780.2</td>
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<td>429.1</td>
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<td>978.7</td>
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<td>1,136.0</td>
<td>1,317.0</td>
<td>850.8</td>
<td>837.8</td>
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<td>1,918.0</td>
<td>1,988.5</td>
<td>1,890.0</td>
<td>2,132.3</td>
<td>1,665.2</td>
<td>1,864.5</td>
<td>2,230.7</td>
<td>2,224.9</td>
<td>17,541.2</td>
<td>100.0</td>
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</table>


Note: — = not available; EAC = East African Community; p = provisional data; SADC = Southern African Development Community.
References


Adaptability of E-government Policy in Mongolia: A Comparative Study with Japan

Odgerel Ulziikhutag

Electronic government is the use of information and communications technologies to transform government by making it more accessible, effective, and accountable. The government of Mongolia recognizes the importance of e-government in delivering public services to sparse populations living in a vast landlocked territory. Without a clear vision and e-strategy, Mongolia may have difficulty identifying how to prioritize its actions. This study examines the adaptability of e-government policy in Mongolia, based on a comparative study with e-government in Japan. This report consists of four key parts. The first part is a summary of e-government literature. The second part comprises a review of recent trends in Mongolia’s development of information and communications technology (ICT) and e-government, and research on Japan’s ICT sector and e-government. The third part of the study identifies the key challenges facing Mongolia’s e-government. The fourth part identifies eight general lessons that Japan’s e-government experience can offer to Mongolia.

The government of Mongolia recognizes that information and communications technology (ICT) has an important role to play in its development. In 2005, the government has been formulating an information technology (IT) package law and implementing the e-Mongolia National Program. There is a need to conduct research on ICT policy, especially concerning e-government, although it is true that there are limited human and technological resources to meet this need. Therefore, my main goal in conducting this research is to support the development of e-government policy in Mongolia. To accomplish this goal, the study reviews the development of the ICT sector and e-government initiatives in Mongolia, and compares them with the Japanese situation from 2000.

My secondary goal for this study is to conduct case investigations of local-level Japanese e-government services in Okayama Prefecture and the city of Yokosuka. The findings I present here are founded on a baseline study of the e-Japan strategy, my internship with the Japan International Cooperation Agency, two case studies, and Web-based research. My study helped...
me identify the key challenges Mongolia faces in establishing successful e-government policies, and I conclude this report with some policy recommendations for confronting those challenges.

The study methodologies I used were (1) a comparative study of ICT strategies and e-government in Mongolia and Japan; (2) interviews with Japanese central and local government officials concerning the implementation of e-government projects; (3) observation of public opinion from thematic discussions, e-forums, seminars, conferences, and various forms of media; (4) a study of theoretical literature on ICT strategy and e-government, and (5) discussion with decision makers and ICT experts from Japan and Mongolia. In this work, I used policy documents, annual reports, research reports, and quantitative and statistical data from the government of Mongolia; the Mongolian Information and Communications Technology Authority (ICTA); the National Statistical Office of Mongolia; the World Bank; the Organisation for Economic Co-operation and Development; the Asian Development Bank; the United Nations; Japan’s Ministry of Public Management, Home Affairs, Posts, and Telecommunications (now the Ministry of Internal Affairs and Communications); InfoCom Research Inc.; InfoCon Co., Ltd.; and several Japanese research institutions.

**E-government Literature Review**

This section of the report briefly introduces the concept of e-government and discusses its status in the Asia-Pacific region, beginning in 2000.

In the past six years, many governments have recognized that ICT can help improve the development of their public sector. ICT has provided them with the capacity to make improvements via e-government (OECD 2003). The governments in the Asia-Pacific region are in the initial phases of adopting ICT to improve financial management and reporting of information, streamline the delivery of government services, enhance communication with their citizenry, and serve as a catalyst for empowering citizens to interact with the government (Wescott 2001).

It is important to note, however, that Rosenau (2000) has argued that the adaptive challenges of governance go far beyond technology per se—they call for new organizational structures and skills, new forms of leadership, and perhaps even a redefinition of purpose. They also call for a significant broadening and transformation of public-private sector partnerships and the relational dynamics that underpin them.¹

**Definitions of E-government**

There are many definitions of e-government and the term itself is not universally used. The differences are not merely semantic and they may reflect priorities in government strategies (OECD 2003). Box 6.1 provides the principal definitions of e-government that appear in the literature.

**E-government in the Asia-Pacific Region**

The use of modern information and communications networks in governmental organizations and in private households around the world has a short history; and its long-term effects on politics, economics, and society cannot be determined. In business, however, ICT has a long and intensive history of use, so its economic relevance can be measured now (Meyer and Wilhelm 2002). The public sector has begun to recognize the potential opportunities offered by ICT and models of e-business to fit with citizens’ demands, to offer better citizen services, and to increase government efficiency by streamlining internal processes (Ndou 2004). Governments worldwide made rapid progress in embracing ICT for e-government in the period from 2000 to 2006. The 2004 e-government readiness survey conducted by the United Nations (UN) assessed more

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¹ The new dynamics are very far from traditional public sector procurement and contracting processes.
than 50,000 features of e-government Web sites in the 191 UN member-states to ascertain how willing and ready are governments around the world to employ the opportunities offered by ICT to improve their citizens’ access to and quality of basic social services for sustainable human development (UN 2004). Because they have a higher level of per capita income, human development, and basic infrastructure than do some other developing regions, most of the countries of South and Eastern Asia reported steady progress in 2004 and a readiness index for the region that is higher than the world average (see table 6.1).

Data presented in the table show that the Republic of Korea was the regional leader (0.858), followed by Singapore (0.834) and Japan (0.726). These countries improved upon or maintained their relative positions in the global readiness rankings in 2004. Korea improved by 8 points, Singapore by 4, and Japan maintained the same relative position it held in 2003. Among other notable gainers were Thailand (+6) and China (+7). Even though its e-government offerings are still being developed, the greatest gain in rank was posted by Mongolia, which advanced 28 places—from 103rd in 2003 to 75th in 2004.

<table>
<thead>
<tr>
<th>Regional rank</th>
<th>Country</th>
<th>Index 2004</th>
<th>Global ranking</th>
<th>Change</th>
</tr>
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<td>1</td>
<td>Korea, Rep. of</td>
<td>0.8575</td>
<td>13</td>
<td>5</td>
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<tr>
<td>2</td>
<td>Singapore</td>
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<td>4</td>
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<td>Thailand</td>
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<td>14</td>
<td>Lao PDR</td>
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<td>149</td>
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<td>15</td>
<td>Timor-Leste</td>
<td>0.0463</td>
<td>169</td>
<td>174</td>
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Average | 0.4603 | n.a. | n.a. | n.a. |

Source: UN 2004.
Note: n.a. = not applicable.
Overview of ICT Development in Mongolia

This section of the report briefly reviews policy and regulatory issues, ICT strategy, and electronic government in Mongolia.

Policy and Regulatory Issues

Mongolia’s parliament revised and passed the Communications Law in November 2001. Under this law, the government established the Communications Regulatory Commission, which is responsible for issuing licenses, regulating and interconnecting tariffs, monitoring service quality, and numbering and regulating radio frequency (for additional information, see http://www.crc.gov.mn). In October 2004, the government established the Information and Communications Technology Authority by joining the former ICT department of the Ministry of Infrastructure with the Post and Telecom Agency. According to the Government Action Plan for 2004–08, the ICTA, organized under Mongolia’s Office of the Prime Minister, has three major tasks: (1) developing ICT laws, (2) implementing the e-Mongolia program (described below), and (3) developing an e-government master plan.

ICT Strategy

In February 2000, Mongolia’s parliament passed a policy document titled “Vision 2010 for the ICT Sector of Mongolia.” The mission of this document is “to build a community based on knowledge and intellectual capacity to improve the living standards of the people” (GoM 2003, p. 101). The main strategies for accomplishing that mission are outlined in “Vision 2010,” which aims to provide favorable conditions for the development of government-legislation, business-economic, and people-society frameworks.

The government approved the medium-term strategy (2003–05) for developing the ICT sector and an action plan for its implementation in January 2003. This strategy identifies harnessing the potential of ICT as a key development tool, and it is supported by these four pillars: (1) establishing the appropriate regulatory framework, (2) developing information infrastructure, (3) establishing a business framework, and (4) developing human resources.

In October 2005, Mongolia’s government adopted the e-Mongolia National Program. The document formulates the midterm (2005–12) sector policy and presents a road map for implementing ICT. The e-Mongolia National Program, based on the concept of using ICT to improve the welfare of the people of Mongolia, covers the use of this technology in government, education, health, and commerce subprograms.

E-government in Mongolia

In 2005, the ICTA developed an e-government master plan, which incorporates the belief that the most effective e-government strategy involves depending on input from a variety of stakeholders. Increasingly, government employees, businesses, nongovernmental organizations, and citizens are brought into the process of defining e-government strategies. The master plan is intended to develop national competitiveness and enhance quality of public services by establishing an effective, systematic, and productive e-government. Figure 6.1 shows that Mongolia envisions its e-government producing economic development; administration efficiency; and improvements in government-to-citizen, government-to-business, and government-to-government services. These objectives can be achieved by providing civil servants with ICT education, establishing ICT laws, and securing the sponsorship of high-ranking civil servants who execute the e-government strategy and tactics. The 22 projects of the e-government master plan generally address the digitization of government information and procedures and the provision of selected information resources and public services via the Internet.
The present study points out that the existing master plan addresses only central government issues. In the future, more intensive actions should be undertaken to develop local e-government, which would offer a good opportunity to hear local citizens’ voices, promote citizen participation, and bridge the digital divide. Local e-government could be used to address common issues at the community level—issues such as poverty reduction, health and education services, environmental problems, and land management.

Overview of ICT Development in Japan

This section briefly reviews policy and regulatory issues, ICT strategy, and e-government in Japan.

Policy and Regulatory Issues

The telecommunications business began in Japan in December 1869 when public telegraph services opened between Tokyo and Yokohama. In December 1890, telephone exchanges opened in Tokyo and Yokohama, and switching began between the two cities. Thereafter, under state control, telegraph and telephone services evolved into the complex industry they are today (Akat-suka and Yoshida 1999). Japan’s Ministry of Internal Affairs and Communications carried out a partial revision of the Telecommunications Business Law and the Law Concerning Nippon Telegraph and Telephone Corporation (Ministry of Public Management 2004). The revised laws, which took effect in April 2004, promote deregulation so that private carriers can demonstrate their capabilities fully, ensure the minimum safety net required by society, and seek to make the entire system more convenient for users in Japan.

During the year 2000, considerable progress was made in devising policies aimed at promoting information technology. The IT Charter, adopted at the G-8 Summit in Okinawa in July 2000, focused on the issues concerning the digital divide and stipulated the need for policies designed...
to rectify that problem. Prior to the opening of the summit, Japan had established a government-sponsored promotion system and pounded out plans and measures for a national IT strategy (JIPDEC 2001).

In November 2000, the Basic Law on the Formation of an Advanced Information and Communications Network Society (IT Basic Law) was passed by the Diet, Japan’s parliament, and it took effect in January 2001. The Strategic Headquarters for the Promotion of an Advanced Information and Telecommunications Network Society (ITSH) has been set up within the cabinet in accordance with the IT Basic Law. In principle, the private sector will take the lead in forming a knowledge-emergent society, and the state and local governments will implement measures to create an environment where the private sector can exert its full potential (Article 7 of the IT Basic Law).

In 2001 and 2003, respectively, the ITSH developed the e-Japan strategy I and strategy II, aimed at making Japan the most advanced IT nation in the world. These strategies will be discussed in more detail in the following section.

**E-Japan Strategy I and Strategy II**

The government of Japan developed the nationally targeted e-Japan strategy to create an information society. The first e-Japan strategy envisioned Japan as the world’s leading ICT nation by the year 2005 (Ministry of Public Management 2004). The program defined the roles of the private and public sectors so that the private sector would take the lead in the area of IT. The central government ran priority policy programs in 2001 and 2002 under e-Japan strategy I. The most significant achievement of the first strategy has been the development of ICT infrastructure, particularly the drastic growth of broadband access, especially asymmetric digital subscriber line (ADSL) technology. Figure 6.2 shows that the total number of subscribers was 14.95 million in December 2003. In particular, there were 11.20 million ADSL subscribers, an increase of approximately 1.5 times over the number of subscribers in the previous year (Ministry of Public Management 2004, p. 6).

In view of those numbers, the government decided that most of the goals of the first ICT strategy had been achieved. Therefore, it moved ahead to the second phase of the strategy (ITSH 2003). Introduced by the ITSH in July 2003, e-Japan strategy II aims to ensure that Japan maintains its position as the world’s IT leader from 2006 onward. In this second stage, Japan will begin to use infrastructure established during the first phase to actively transform e-tools for Japanese public, social, and economic systems (Ministry of Public Management 2004). Strategy II proposes to take leading measures in seven important areas that are closely related to the lives of the Japanese people. The areas are medical treatment, food, life, finance for small and medium-size enterprise, knowledge, employment, and government service. The strategy also seeks to advance the development of new IT social infrastructures during the second phase.

In 2004, the e-Japan strategy budget related to e-government and to the formation of an advanced information and communications network society reached 830.8 billion yen and 1,548.1 billion yen, respectively. These amounts are increases of 255.3 billion yen and 12.6 billion yen over the figures of the previous fiscal year, respectively (Ministry of Public Management 2004).

**E-government in Japan**

The e-government efforts will enable all citizens and companies to access public services without being restricted by time or location, thus making business activities more pleasant.

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3. Through the e-Japan strategy, the government will create a “knowledge-emergent society” that fosters creativity to exchange knowledge among citizens. See e-Japan strategy’s vision of the ideal IT society (ITSH 2001).
and convenient. They also will enhance the efficiency and transparency of administrative management.

The Kasumigaseki wide-area network (KWAN) is the government network connected to all ministries’ local-area networks. KWAN started in January 1997 to promote information sharing and electronic filing using technologies for access control and security (Yasunaka 2003).

The Japanese e-government portal was launched in April 2001, and it is expected to be a one-stop access gateway for online services. It comprises a search function for information from all ministries, a database of government information (such as laws and geographic data), links to local and central government Web sites, and so forth. Most of the contents are available only in the Japanese language. Compared with “e-gov” portals in other countries, the Japanese portal lags far behind in citizen satisfaction and usability (Muta 2004).

All national administrative procedures (approximately 52,000 of them), including applications and notifications by people and companies, had been made accessible 24 hours a day from home or office computers via the Internet by the end of fiscal 2003. The local government wide-area network (LGWAN) will be connected to all local governments, prefectures, cities, and other municipalities by the local government public key infrastructure, and will cover all the local governments. Development of an environment for performing administrative functions online is essentially complete, including the Basic Resident Registers Network System (Jyuki Net) that became fully operational in August 2003, the start of a public personal certification system that operates online, and electronic payment services for taxes and various administrative fees that began operating in January 2004 (Ministry of Public Management 2004).

As the moves toward e-government become more specific in the future, the relationship between the residents and the administration likely will become closer. At some point in the future, the Japanese term yaku-sho (public office) may move closer to the expression yaku-ni-tatsu (useful), signifying the shift from “officious” to “useful” in the public’s perception of government functions and of the ability to access such functions through the Internet. Steps are being

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4. In this report, a billion is 1,000 million.
taken toward such a future (InfoCom 2003). However, it is hard for those who are not fluent in Japanese to find the government information and services in English.

CASE STUDY A: YOKOSUKA ONLINE TENDER SYSTEM. Yokosuka is a city of green hills surrounded by the brilliant blue sea; it is situated in the central area of the Miura Peninsula in southeastern Kanagawa Prefecture and is bordered by Tokyo Bay to the east and Sagami Bay to the west. The population of Yokosuka reached 430,000 in 2004. Since 1996, Yokosuka has come under the international and domestic spotlight for its use of ICT in its efforts to complete the basic foundations for local e-government city management and citizen services. The latest ICT research is being conducted at the Yokosuka Research Park.5

Realizing the need to save labor by digitizing the bidding process, the city implemented an electronic bidding system in September 2001. All processes take place via the Internet—submissions of bidding applications, certification of companies wishing to bid, the actual bidding, and announcement of results.

This electronic system has had a large financial effect. All bids submitted by all competitors are opened online to ensure the transparency of the procedure and eliminate injustice. The open process promotes competition and lowers the contracting price. Bidders save time and money because they no longer have to visit the city procurement office in person at least once during the bidding. In 1997, before this reform took place, the average number of participating traders was 9. In 2002, the total number of traders reached 22.

Yokosuka has been able to normalize bidding by improving its bidding system and procedures. This does not mean, however, that normalization can be achieved in the same way by all local governments. The measures that need to be taken will differ according to the size of a city’s population. Furthermore, electronic bidding can change the established concept of participating in public bids because it removes geographical restrictions and enables tenders to be submitted from anywhere in the country.

CASE STUDY B: OKAYAMA INFORMATION HIGHWAY. The Okayama Prefecture is located at the heart of the Chugoku-Shikoku region. Its population reached 1.95 million in 2001. The prefecture comprises 7,111 square kilometers of land. In April 1996, the Okayama Prefecture launched an information network for reducing regional disparities. The prefecture government office transferred operation and maintenance of the network to a private company. This transfer serves as a good example for engaging the private sector in reducing development and maintenance costs, providing services for residents and labor-saving processes for business, and offering solutions to counter the lack of human resources. Such a public-private partnership can free the prefecture government office to focus on core policies of IT use in the prefecture.

Moreover, the prefecture plans to promote further ICT to improve the Okayama information highway. Okayama Research Park Incubation Center, funded by the prefecture and launched in April 2003, is the first business incubation facility run under the Private Finance Initiative scheme in Japan.6

Another good example of government enabled by electronics is the Niimi e-voting system. The city of Niimi in Okayama Prefecture implemented electronic voting on touch-screen machines in June 2002. The system was designed to facilitate the quick counting of votes and to reflect accurately the will of the people by reducing the number of spoiled and invalid ballots (InfoCom 2003). In approximately 25 minutes, more than 15,000 voters from 43 polling stations voted via a touch-screen system. Officials reported that the electronic voting went smoothly, except for an initial machine problem that delayed the issuing of voting cards to 15 people (Benoit 2004).

Some 100 local municipalities observed Niimi’s experiment with electronic voting, and several municipalities are preparing to adopt e-voting in the near future. This will bring elections

5. For information, see http://www.yrp.co.jp/en/.
6. For information on this business incubator, see http://www.oric.ne.jp/~oric/index.html.
closer to people and, as a result, will change the way that democracy is perceived and practiced in Japan (InfoCom 2003).

The Okayama information highway project is succeeding because of public-private sector partnership cooperation. Internet access in Okayama Prefecture today is among the best in Japan. The government now needs to promote more active use of the infrastructure by making Internet use a part of everyday life for all its citizens, whether they do or do not own personal computers.

**Key E-government Challenges in Mongolia**

The key e-government challenges facing Mongolia are strategy development, leadership, human resource development, management change, the digital divide, technological change, public-private partnerships, and citizen participation.

**Strategy Development**

Information and communications technology has become the core development issue in most developing countries in Asia. In Mongolia, landlocked and sparsely populated across a vast landscape, ICT is an extremely important development factor in overcoming these challenges. It is necessary to extend ICT to all sectors of society to develop knowledge-based industry and establish an information society (ICTA 2004).

In October 2005, the government of Mongolia adopted the e-Mongolia National Program, which formulated the midterm (2005–12) sector policy and the ICT implementation road map. The e-Mongolia National Program is based on the idea of using ICT to improve the welfare of the people of Mongolia, and it covers e-government, e-learning, e-health, and e-commerce subprograms.

In 2005, the Information and Communications Technology Authority implemented the e-government master plan. I believe that the most effective e-government strategy is to depend on input from a variety of stakeholders. Increasingly, government employees, businesses, non-governmental organizations, and private citizens are brought into the process of defining e-government strategies.

**Leadership**

A major challenge for the government of Mongolia during the transition period has been to reform its institutional structure in such a way that both the government and the public sector are able to provide the necessary leadership and management for the conduct of public affairs. Mongolia inherited large bureaucratic machinery from the previous command system of public administration, as well as entrenched, obstructive, bureaucratic attitudes and behavior within the civil service (UNU 2002).

A national seminar on ICT, organized in February 2001, resulted in the formation of a National ICT Committee headed by the prime minister of Mongolia. This committee comprised representatives from government, civil societies, academic organizations, and the private sector.

In 2004, the government established ICTA under the aegis of the prime minister. The authority is responsible for overall policy formulation, planning, implementation, and coordination of all ICT-related issues.

**Human Resource Development**

Human development issues were not addressed adequately during Mongolia’s decade-long transition to an open economy and a democratic political system. Skilled managers and technologists are in short supply. Since 1990, the tertiary education sector has led to a large increase
in the number of graduates. But many of them have no practical skills. In an employer survey carried out in 2001, 48 percent of organization respondents said that high school graduates lacked an interest in business, and 24 percent said that graduates of higher education had poor levels of technical knowledge. Therefore, the government considers one of the essential tasks for Mongolians at the beginning of the 21st century is to become universally computer literate.

Management Change

Many scholars argue that organizational culture is the key driver of management change. Governmental hierarchy, however, embodies the most traditional cultural values of the bureaucracy. In my comparative study of Mongolian and Japanese organizational cultures and management features, I discovered some policy implications for managing change. By analyzing various research reports as well as books by Dorj and Chimed (2000), Kono and Clegg (2001), and Kunishima and Shoji (1996), I concluded that there are significant differences between the public organizational cultures of the two countries. Japanese management techniques (including such star performers as lifetime employment, a seniority-based wage system, and consensus decision making) clearly do not fit the nomadic Mongolian soil. There are policies and experiences, however, that are universally applicable. The comparison of these two nations’ organizational cultures is presented in table 6A.1.

The Digital Divide

Many developing countries suffer from the “digital divide” and these countries are not able to deploy the appropriate infrastructure for e-government. The digital divide is generated by the prevalence of digital technology, and refers to the opportunity gap between people who are able to use and become educated in the technology and those people who are not. People’s access to technology is dependent on income, age, education level, geographic and physical constraints, and so forth. This divide is recognized as a social issue (ITSH 2003).

InfoCon (2003) has found that few official statistics on ICT development are available, and that the lack of reliable data sources has restricted the preparation of a comprehensive study on e-readiness assessment of Mongolia. Figure 6.3 illustrates Mongolia’s electronic readiness to connect with a networked world, as of 2003.

Technological Change

All countries implementing e-government have struggled to develop a basic infrastructure to take advantage of new technologies and communications tools (World Bank 2002). Compaine (2001) argued that technology casts a long shadow. Thus, there is time for society to see how some technology or combinations of technologies move toward their natural markets and costs. Because technological change automatically determines the jobs, however, it has a social and human impact. As a result, a sociotechnical approach should be used jointly to choose the jobs and the technology at the same time.

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7. The assessment methodology and approach to investigating e-readiness that were used by the InfoCon team were based on the guide for developing countries, “Readiness for the Networked World,” available at http://www.readinessguide.org, as presented by the Center for International Development at Harvard University.
In the mid-1990s, Mongolia embraced ICT, although it focused its efforts mainly on rehabilitating telecommunication networks and introducing some digital technology. This changed in 1996 when the first Internet service provider, Magicnet, was established in Mongolia.\footnote{The first project was a domestic e-mail system called Mongolian Access to Global Information and Communications Network—in shortened form, Magicnet.}

Since 1999, the government has taken a broader interest in ICT that encompasses such matters as e-government, e-commerce, and Mongolian application and content development. There are reasonably better technological possibilities for using Internet and e-government services in Mongolia. The level of computerization in central and local governments, however, varies from place to place, and it has become a major constraint to widely introducing e-government services.

**Public-Private Partnerships**

The private sector produces 80 percent of Mongolia’s gross national product, so it is evident that the sector is well established in the national economy. Mongolia’s strategy for private sector development is rooted in successful implementation of structural reforms in the production and service sectors, especially in the privatizing of large state-owned enterprises (ADB 2004). Since 1995, private foreign mobile phone operators have entered the Mongolian telecommunications market, and most Internet service providers are private companies.

Within the public-private partnership framework, the government is cooperating successfully with bank and financial organizations, telecommunications operators, Internet service providers, and computer trade companies. However, the government of Mongolia needs to clarify procedures and financial arrangements for implementing a public-private partnership.

**Citizen Participation**

Citizen participation means taking an effective role in decision making and planning. Channels through which the Mongolian citizenry can take part have opened through the growth of civil
society, the expansion of the marketplace, the advancement of democracy, and the opportunities of telecommunications. Public participation is low, however, because of a lack of initiative and the inertia left behind by a command-administrative system that discouraged ordinary people at the grassroots level from taking personal and community responsibility. In addition, low population density, financial constraints, and underdeveloped communication networks have added barriers to participation, and there exists a poor understanding of democracy and human rights (GoM and UNDP 2003).

In 2000, the Office of the Prime Minister launched the Web site http://open-government.mn. The electronic participation mechanism includes online legislative and online policy forums. Both are used frequently and appear to be very popular. In addition, there is an occasional “online conference” in which users are given the opportunity to chat directly—albeit electronically—with identified officials (UN 2004). At this point (late 2006), however, this Web site addresses only central government issues, so cooperation with local governments is needed to provide a channel for local citizens’ voices to be heard.

Conclusions and Recommendations

This report has revealed some important issues and challenges to consider in designing and implementing successful e-government initiatives in Mongolia. The comparative study of Japan’s experience with electronic government offers a number of policy and process lessons that will be useful in Mongolia.

The first lesson addresses the establishment of a nationwide strategy for developing e-government policy. The Japanese experience shows that development strategy should be carefully planned and implemented with the appropriate timing, human resources, and financial arrangements. These factors will help realize the overall goal. Furthermore, the Mongolian government should carefully investigate whether a strategy it is considering actually fits Mongolian governance culture, tradition, and society.

The second lesson from Japan is that ambitious leadership is needed for the e-government initiatives. Political and governmental support for central and local e-government initiatives are essential in setting up the required organizational structures.

The importance of investing in human resource development is the third lesson learned from the Japanese experience. Whitehill (1991) identified Japan’s great resource not as its land but as its people, with almost 100 percent literacy and an inborn love for learning and self-development. Mongolia, too, quickly must become universally computer literate and must create the basic skills for e-government.

The fourth lesson Mongolia can take from Japan concerns which Japanese management techniques are exportable. Life-long employment, wage systems based on seniority, and other policies have worked well in Japan, and although not all of them will be applicable in Mongolian settings, there surely are ideas to be developed.

The fifth lesson concerns how we adapt to new technology. A leading Japanese critic and editor (Kasuya 1989) perhaps described how best to approach the future in these well-chosen words:

It is never easy to know what the future holds. The globalization and technological achievement are to be expected, but these trends alone do not provide a clear blueprint of what will transpire. Much will depend on how well we learn the lessons of our past successes and failures. To ensure that the success of the past 40 years is not squandered away in the next 40, we must reinvigorate the country’s institutions to promote and maintain a dynamic society (p. 289).

Mongolians are largely influenced by a nomadic culture, which produces a flexible mindset. For centuries, we have been learning to adapt to ever-changing environments, and that should
equip us to flow with changes in technology. However, low computer literacy and little local content are significant challenges for adapting e-government applications in Mongolia.

The sixth lesson concerns bridging the digital divide. The government of Mongolia needs to take action to develop local e-government policy, to implement universal services in rural areas, and to improve broadband Internet access in suburban areas. Japan’s experiences with local e-government initiatives, a universal service fund system, and ultra-low interest and tax incentives could be good examples.

The importance of developing public-private partnerships is the seventh lesson we learn from Japan. Mongolia needs to develop clear e-government policies for building trust between government and the private sector. Success demands that policies for implementing these partnerships be well designed and formulated, and that procedures and financial arrangements are clarified for all parties.

The last lesson for Mongolia concerns the improvement of citizen participation in e-government. Mongolia’s leaders recognize that e-government can help strengthen citizen participation in the decision-making process and can promote open and accountable government. Adapting some of the methods Japan uses to open a dialogue between its elected leaders and its citizens may promote participation in our country.
<table>
<thead>
<tr>
<th>Criterion</th>
<th>Japan</th>
<th>Mongolia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goals and vision</td>
<td>Balancing multiple goals of organizational bodies, but respect for people has highest priority</td>
<td>Adapting government to the requirements of the market economy in a democratic society and assisting the creation and consolidation of a viable private sector&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Business relationship style</td>
<td>Long-term credible relationship</td>
<td>Short-term credible relationship</td>
</tr>
<tr>
<td>Working style</td>
<td>Teamwork</td>
<td>Individual work</td>
</tr>
<tr>
<td>Employment type</td>
<td>Lifetime employment</td>
<td>Short, midterm employment, often shift between jobs</td>
</tr>
<tr>
<td>Employment attitude</td>
<td>Employing persons</td>
<td>Employing persons</td>
</tr>
<tr>
<td>Principles of behavior</td>
<td>Attend, learn, and labor</td>
<td>Participate, challenge, and create</td>
</tr>
<tr>
<td>Wage system</td>
<td>Seniority and achievement</td>
<td>Seniority and achievement</td>
</tr>
<tr>
<td>Organizational change</td>
<td>Slow</td>
<td>Rapid</td>
</tr>
<tr>
<td>Organizational structure</td>
<td>Organic organization, good interface between departments</td>
<td>Mechanistic organization, weak interface between departments</td>
</tr>
<tr>
<td>Decision-making process</td>
<td>Bottom-up and mutual agreements between managers and employees</td>
<td>Top-down and performance contracts between managers and employees&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Loyalty to organization</td>
<td>Great</td>
<td>Little</td>
</tr>
<tr>
<td>Competition within organization</td>
<td>Avoid</td>
<td>Open</td>
</tr>
<tr>
<td>Relationships between colleagues</td>
<td>Commonness of rice peasants—“one for all”</td>
<td>Individual behavior of nomads—“one for one”</td>
</tr>
<tr>
<td>Relationships with the private sector</td>
<td>Strong alliance of public and private sectors, no real competition</td>
<td>Weak alliance with private sector, partial competition</td>
</tr>
<tr>
<td>Perception of work</td>
<td>Enforcement of hard work (workplace is a second home)</td>
<td>Responsible</td>
</tr>
<tr>
<td>Human resources</td>
<td>Fixed assets</td>
<td>Floating assets</td>
</tr>
<tr>
<td>Reward</td>
<td>Large (bonuses, promotions, and salary increases)</td>
<td>Small (honor certificates, medals, and promotions)</td>
</tr>
<tr>
<td>Punishment</td>
<td>Relocation</td>
<td>Relocation and dismissal</td>
</tr>
<tr>
<td>In-house education</td>
<td>Systematic and seriously taken</td>
<td>Self-study</td>
</tr>
<tr>
<td>Salary differences between managers and employees</td>
<td>Small</td>
<td>Small&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

<sup>a</sup> The strategic business mission of the government of Mongolia was approved by the Parliament of Mongolia in 1996.

<sup>b</sup> The ideas and opinions of the relevant bodies (government organizations, the private sector, and nongovernmental organizations) are partially discussed, but only high-ranking managers in charge will make final decisions.

<sup>c</sup> Even the formal salary difference is small. Informal income based on rank is high.
References


0018.worldbank.org/.

Acronyms

ADF  augmented Dickey-Fuller test
ADSL  asymmetric digital subscriber line
AIC  Akaike information criterion
DSL  digital subscriber line
EAC  East African Community
ECT  error collection term
EFRC  environmentally friendly road construction
ERP  Economic Recovery Program
EU  European Union
FDI  foreign direct investment
FTTH  fiber to the home
GDP  gross domestic product
GNP  gross national product
HIC  high-income country
ICT  information and communications technology
ICTA  Information and Communications Technology Authority
IT  information technology
ITSH  Strategic Headquarters for the Promotion of an Advanced Information and Telecommunications Network Society
IV  instrumental variable
JJ/WBGSP  Joint Japan/World Bank Graduate Scholarship Program
KWAN  Kasumigaseki wide-area network
LGWAN  local government wide-area network
LIC  low-income country
LRM  linear regression model
MIC  middle-income country
OLS  ordinary least squares
RER  real exchange rate
SADC  Southern African Development Community
SIC  Schwarz information criterion
UAE  United Arab Emirates
UN  United Nations
UNCTAD  United Nations Conference on Trade and Development
WTO  World Trade Organization