Awarded Theses
2007

Joint Japan/World Bank Graduate Scholarship Program

THE WORLD BANK

Awarded Theses

2007

Joint Japan/World Bank Graduate Scholarship Program

World Bank Institute
Washington, DC

Contents

Box

Figures

Tables

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. Its purpose is 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 3,754 scholarships for study in 250 universities in 32 World Bank member-countries. All scholarships have been funded solely through the government of Japan.

In 2005, the JJ/WBGSP launched the Scaling-Up Program as a better means of leveraging knowledge acquired by the sponsored scholars and of fostering a network of development practitioners, including JJ/WBGSP scholars and alumni. The program has been providing opportunities for scholars to generate new knowledge for development, and the World Bank recognizes that there is a great opportunity to tap into this knowledge for the benefit not only of the scholars but also of the development community as a whole. To date, the Scaling-Up Program has held four regional conferences that gave alumni opportunities 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. Two successful regional conferences were held during fiscal year 2008—one in Dar es Salaam, Tanzania, in March 2007 and one in Tokyo, Japan, in June of that year.

Two decades of experience have shown that the JJ/WBGSP is an invaluable resource for building skills and imparting competencies to development professionals—skills that are necessary for countries to prosper in the highly interconnected and competitive global economy. The record of scholars' promotions when they return to their countries shows that the program has reinforced their capacity to make well-informed decisions and carry out effective socioeconomic reforms. The program marked its 20th anniversary with a special conference in Tokyo where its graduates and some 150 distinguished guests from around the world gathered at Keio University. Many successful scholarship recipients shared testimonials regarding their experiences in the study program.

It is our great honor to deliver this publication containing the six theses presented and awarded in Dar es Salaam and Tokyo. These papers address the following topics from a wide range of research fields:

- *Causes of Default in Government Microcredit Programs: A Case Study of the Uasin Gishu District Trade Development Joint Loan Board Scheme, Kenya,* by Rose Ajiambo Bwonya-Wakuloba
- *Corruption Diagnostics: Prescribing a Reform Agenda for Indonesia,* by Carolina Pondang Austria and Pratibha Krishnamurthy
- *Unemployment Compensation and the Risk of Unemployment: The Case of Argentina,* by Ana Lucía Iturriza
- *Distributional Implications of Power Sector Reforms in the Philippines,* by Wondielyn Q. Manalo-Macua
- *How to Improve Export Competitiveness in Mauritius,* by Marilyn Whan-Kan
- *Export Performance and Economic Growth in Ethiopia,* by Kagnew Wolde.

We are happy to tell you that all the authors of these papers now occupy important positions in government organizations in their home countries, and they have committed themselves to keeping the network alive.

We are very grateful to the government of Japan for the funding that made it possible to bring together all the scholars who are published here. And we hope that the knowledge extended by the JJ/WBGSP scholars will be of interest to you.

<div align="right">

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

</div>

1

Causes of Default in Government Microcredit Programs: A Case Study of the Uasin Gishu District Trade Development Joint Loan Board Scheme, Kenya

Rose Ajiambo Bwonya-Wakuloba

This study endeavors to investigate causes of default in government microcredit programs. The problem identified was that government microcredit programs perform poorly because of slow repayment and high default rates. Hence, it was important to establish if these limitations prevailed in the Uasin Gishu District Trade Development Joint Loan Board (UGLB) scheme by determining the average repayment delay and default rate and the causes of the observed trends. The results reveal that the board has an average repayment delay of 31 percent. The default rate increased over the review period and averaged 31 percent as well. The main cause of default was found to be poor business performance, in terms of low profitability or business losses. Loan diversion to unprofitable uses, domestic problems, numerous dependents, and tenancy problems were other factors that caused loan default. The inability to deal with slow repayment and default also was a matter of concern. The study found that operations and maintenance resources are too small to facilitate follow-up on loan usage, and that management information systems are manual. Such systems do not facilitate early detection of potential defaulters and slow-repaying borrowers. Further, nonprosecution of defaulters and the perception that government credits are grants rather than loans encourage default. The board is also understaffed, and key personnel have limited computer skills—factors that cause delays in processing and disbursing loans. Study recommendations are geared largely toward improving the board's capacity to manage the loan program. The board should computerize its management information system and build staff capacity in computer applications. Staff strength should be increased, and sufficient operations and maintenance budgets should be provided. Processes should be worked out to identify borrower capacity and any obligations that may interfere with repayment. Finally, the board should intensify recovery of outstanding balances from defaulters through increased borrower follow-up.

Microenterprises are an important source of livelihood for many people in the developing world. Consequently, lending institutions have shown an interest in these enterprises through the provision of microcredit. Whereas some lending institutions are profit oriented, government

mainly provides alternative credit to the most vulnerable groups to enable them to attain the standard of creditworthiness required by commercial lending institutions.

"Microcredit" refers to small loans extended to poor people so they can undertake self-employment projects that generate income and enable them to provide for themselves and their families. This form of credit is targeted toward people in the lower economic brackets of society.

Rural-based microcredit programs in particular have the potential to help poor people perform some business activities through which they may acquire employment as well as income. As such, microcredit provision has been an effective development intervention because such services can be directed specifically to the poorest members of the population.

In Kenya, the 2003–07 Economic Recovery Strategy for Wealth and Employment Creation (ERS) policy document has set a target to create 500,000 jobs annually during the recovery period. Accordingly, it intends that 88 percent of those jobs be created in small and medium enterprises (SMEs). These enterprises also are expected to contribute to a decline in poverty rates—from 56.7 percent to 51.8 percent. Therefore, provision of microcredit is regarded not only as a tool for empowering the poor, but also as an instrument for alleviating poverty in Kenya.

Because poverty alleviation has been a key development challenge since independence (1963), different programs have been initiated to address the need for microcredit. These initiatives include the Trade Development Joint Loan Board Program conceived of in 1954 and put into operation in 1966, the Rural Enterprise Fund Program initiated in 1991 and first disbursed in 1992, and the District Poverty Eradication Program rolled out to all districts in 2002.

History of Government Credit Programs

District Trade Development Joint Loan Board Scheme

The District Trade Development Joint Loan Board (DLB) scheme in Kenya was launched by the British colonial administration in 1954. The institutional structure was formalized, however, at the time of independence, through legal notice 265 of 1963 local government regulation 104. The program was established to administer loans to Kenyan industrialists, artisans, and businessmen. The program's objectives were to provide financial support and an opportunity to gain commercial experience. Over time, loans were intended to assist in business expansion and were focused mainly on rural areas where the financial sector was underdeveloped. The initiatives also were intended to check rural–urban migration.

Since inception, the DLBs have provided financing to SMEs in most districts of Kenya. Individuals, registered partnerships, and cooperatives are eligible for these loans. Repayment is designed so that the capital sum is repaid in equal monthly installments of principal and interest combined. The program also demands security; but where the borrower has no attachable assets, a responsible person's firm legal guarantee of repayment is obtained.

Although DLBs have been providing loans since independence, reports on nationwide figures are not available at the district trade office. A monitoring and evaluation report on joint loan boards, released in May 2005, however, defines the performance of boards for five financial years. Table 1.1 shows the total amounts of loans disbursed and recovered countrywide through the joint loan board schemes from fiscal 2000/01 to 2004/05.

It is notable that more than K Sh 90.2 million was disbursed by the UGLB and approximately K Sh 73.3 million was recovered. The recovered funds are amounts repaid during the respective years, some of which are for loans disbursed in earlier years. The considerable decline in the amount of money disbursed in fiscal 2001/02 resulted from restructuring and reorganization of Ministry of Trade and Industry field offices.

It is also noteworthy that, during the period under review, 13 of 48 joint loan boards disbursed no loans to entrepreneurs and, hence, were dormant. A monitoring and evaluation report (Ministry of Trade and Industry 2005), however, shows the UGLB leading other boards countrywide in total amounts disbursed and recovered annually over the period (table 1.2).

Table 1.1. *Performance of Joint Loan Board Programs, 2000–04*
Kenya shillings

Fiscal year	Amount disbursed	Amount recovered	Fiscal year	Amount disbursed	Amount recovered
2000/01	23,684,000.00	17,438,003.83	2003/04	18,585,000.00	15,431,083.18
2001/02	5,385,000.00	14,717,455.65	2004/05	21,227,000.00	11,543,646.59
2002/03	21,336,557.00	14,215,918.22	Total	90,217,577.00	73,345,107.47

Source: Joint Loan Boards maintenance and evaluation report, 2005.

Table 1.2. *Performance of the UGLB, 2001–05*
Kenya shillings

Fiscal year	Amount disbursed by UGLB	Amount recovered by UGLB
2001	2,210,000.00	2,686,763.85
2002	1,445,000.00	1,463,864.05
2003	—	2,157,738.35
2004	3,005,000.00	1,568,332.65
2005	2,490,000.00	1,070,273.90
Total	9,150,000.00	8,946,972.80

Source: District Trade Office records.
Note: — = not available; UGLB = Uasin Gishu District Trade Development Joint Loan Board.

With respect to nonperforming loans, the UGLB had a total of 52 nonperforming loans (amounting to K Sh 1,361,642.30). The best-performing loan board was the Nairobi Special Loans Board, which had only seven nonperforming loans (amounting to K Sh 121,561.70). Other joint loan boards (Busia, Kisumu, and Wajir) had substantial amounts in nonperforming loans—amounts ranging from K Sh 6.0 million to K Sh 11.0 million.

Rural Enterprise Fund

The Rural Enterprise Fund was established in 1991 to increase the productive capacity of the borrowers and thereby create self-employment and income-generating opportunities. That outcome was to be achieved by providing loans to small, productive enterprises operated on a self-sustaining basis in rural areas. There were two eligibility criteria: (1) that the activities undertaken be rural based and (2) that those activities generate employment.

The loans were to be repaid at an interest rate of 8 percent, with a grace period of one year on both interest and principal. They were to be repaid in equal monthly installments within five years. Loan security was based largely on an applicant's reputation and character. However, assets purchased with the proceeds of loans made under the fund were to be charged as security in an appropriate form. One critical aspect of the program was its revolving nature, whereby interest and principal amounts repaid would be re-lent to other needy people.

The Rural Enterprise Fund was characterized by a high default rate. Table 1.3 provides a summary of the fund's performance in Uasin Gishu District, based on available records. The initial allocation to the district was K Sh 7,705,229.00. In 2001, the outstanding balances had risen to K Sh 8,821,774.60 on the principal alone.

In addition to the generally dismal performance of the fund, it is notable that repayment worsened in fiscal 1999/2000. It is further noteworthy that no records were available beyond 2001 in the official returns format. The fund is no longer operational, at least in terms of disbursement.

Table 1.3. *Rural Enterprise Fund Outstanding Balances, 1995–2000*
Kenya shillings

Fiscal year	Cumulative repayment amount	Interest repaid	Outstanding amount	Interest outstanding
1995/96	1,309,020.50	358,465.30	4,482,072.00	103,355.40
1996/97	1,467,543.70	384,851.60	6,625,890.00	1,405,231.00
1997/98	1,467,923.10	397,908.20	6,805,901.60	1,354,422.60
1998/99	1,566,296.30	417,343.10	7,400,312.10	1,431,140.90
1999/2000	153,682.60	27,357.70	6,647,900.60	1,471,871.10
2000/01	256,284.60	—	8,821,774.60	—

Source: Rural Enterprise Fund records, Uasin Gishu District.
Note: — = not available.

Available records show that, by 1997, the government was concerned about the fund's widespread high default rate and set up a task force to discover the reasons for the defaults. At that time, the arrears for outstanding cases countrywide totaled K Sh 148,327,505. Uasin Gishu District had an outstanding balance of K Sh 9,270,199, and Eldoret Municipality had an outstanding balance of K Sh 10,712,481. (This study was not able to access the task force's findings on the causes of default.)

District Poverty Eradication Program

The District Poverty Eradication Program was established by the government in 2002. Its objectives were (1) to encourage poor people to save and become more productive, (2) to provide and promote access to cheap and affordable credit, (3) to strengthen existing alternative credit among the poor communities, and (4) to promote innovative approaches to the provision of basic social services (Poverty Eradication Commission 2002).

Unlike the UGLB, the District Poverty Eradication Program targets well-mobilized groups engaged in income-generating activities. It demands no collateral, but does require that the successful applicant projects enter into agreements with a financial intermediary prior to the release of funds. Where deserving poor people are not organized into groups, special effort is made to mobilize them and build their readiness for program support. In the first and second phases of the program, K Sh 900,000 and K Sh 600,000, respectively, have been disbursed to 12 groups. Table 1.4 presents a sample of disbursement and repayment statistics for this program.

Table 1.4. *Loan Disbursements and Repayments by the District Poverty Eradication Program, Selected Groups, 2002–04*
Kenya shillings

Group	Disbursements	Repayments as of April 2004 (% of disbursement)
Moiben Central Women's Group	150,000	43,265 (28.8)
Lengo Self-Help Group	150,000	50,735 (33.8)
Utulivu Self-Help Group	150,000	44,375 (29.6)
Utilivu Self-Help Group	150,000	42,450 (28.3)
Busakama Self-Help Group	150,000	30,830 (20.6)
Total	900,000	241,035 (26.8)

Source: District Poverty Eradication Program records, District Development Office, Eldoret, Uasin Gishu District.

Because data were available only for the initial repayment period, it is difficult to comment on the overall performance of the program.

Details of the Study

The government of Kenya has provided microcredit through various credit programs (such as the District Trade Development Joint Loan Board, the Rural Enterprise Fund, and Kenya Industrial Estates). Government credit programs operate on a revolving-fund basis whereby new loans can be made as existing loans are repaid. Available information, however, shows that repayment has been poor (either slow or nonexistent) and program sustainability has been compromised. As a result of poor repayment, a number of joint loan boards are dormant and others have substantial amounts committed to nonperforming loans. For example, the Rural Enterprise Fund is defunct, having collapsed with substantial outstanding balances. Ikiara (cited in Nasiuma 2003) found that business owners assisted by Kenya Industrial Estates do not pay their debts on time or do not pay them at all, thus constraining that program's ability to help other enterprises.

With such dismal performance, most government programs have failed to achieve their predetermined objectives and have caused huge monetary losses. To advance the understanding of weaknesses in such programs, this study was designed to investigate the causes of loan default in the Uasin Gishu District Trade Development Joint Loan Board scheme.

The study focuses on the UGLB, a government microcredit program, covering its performance in terms of disbursement and loan recovery from microentrepreneurs who received financial support between the years 2000 and 2005.

The study report is organized in five sections. The first section provided background information on microcredit in general and on initiatives of the government of Kenya to provide microcredit. Section two presents a literature review. The methodology used to collect and analyze data is explained in the third section, and section four deals with the research findings. The final section offers conclusions and policy recommendations for enhancing the performance of the UGLB.

The study results will be used for policy formulation and decision making with respect to government microcredit programs. The findings will be useful to the government's district trade offices, development offices, and other departments that implement government microcredit initiatives. Finally, the study will contribute to the existing body of literature and form a basis for additional research.

Literature Review

This review of the existing literature covers studies relevant to the research topic. Areas reviewed include the role of microcredit, default in repayment and its effect on microcredit programs, and challenges facing the microcredit subsector. Literature on strategies applied to minimize default also is discussed here.

Role of Microcredit

Microfinancing is a strategy for alleviating poverty. It is broadly accepted that robust, labor-intensive, and equitable economic growth combined with larger outlays for social programs (especially directed toward the poor populace, now estimated at 1.3 billion people worldwide) is a winning formula in the fight against poverty (UN 1997).

According to the UN Secretary-General (UN 1997), there is increased interest in microcredit to promote growth with greater equity. His report noted that growth occurs through empowering all people by increasing their access to all factors of production, including credit. The report

also observed that poor people's latent capacity for entrepreneurship would be encouraged by the availability of small-scale loans that would introduce them to the small-enterprise sector. Microcredit could enable them to be more self-reliant, could create employment opportunities, and could release women to engage in economically productive activities.

In Kenya, the 2003–07 Economic Recovery Strategy for Wealth and Employment Creation provides the road map for economic recovery. The strategy paper identified restoring economic growth, generating employment opportunities, and reducing poverty levels as key challenges facing Kenya (Ministry of Planning and National Development 2003). The paper estimated that SMEs contribute 18 percent and 72 percent to the national gross domestic product and employment, respectively. Hence, when the ERS anticipated creating 500,000 jobs annually, 88 percent of the targeted jobs were to be created in SMEs. Elsewhere, a survey of SMEs identified a lack of access to affordable credit as one of the key constraints facing the SME subsector.

Microcredit generally is important to the growth and development of microenterprises. However, many credit programs previously viewed the poor as potential defaulters and placed credit programs beyond their reach. Even though wide experience today shows that poor people are not bad credit risks and that their repayment rates can be exemplary, the poor still are considered to be a high-risk credit population, expensive to serve, and unable to pay the full cost of credit; they are believed to require government subsidization of credit.

Repayment Default and Its Effect on Microcredit Programs

The most dangerous problem a microcredit program faces is repayment default. The Association for Social Advancement (ASA, a Bangladesh-based nongovernmental organization focusing on microfinance) has pointed out that if the money invested by the lending organizations cannot be recovered, the whole program may collapse.

Any formal lending program directed toward the poor faces a number of challenges. The first problem is exact targeting to ensure no Type I or Type II errors, as defined by Cornia and Stewart (1992). These are errors of omission of poor people and of inclusion of nonpoor people. The second problem is screening to distinguish the good (creditworthy) borrowers from the bad (not-so-creditworthy) borrowers. This is a problem because poor borrowers generally do not maintain any accounts of their past business activity or furnish any documented business plan for use of the loan they are seeking. Third, the funding agencies may not be able to monitor and ensure productive usage of the loans. Viewed differently, the challenge here is determining whether the loan application is for the purpose of expanding a profitable ongoing business or whether it will be channeled into unprofitable operations.

Achieving and maintaining repayment discipline is crucial to the sustainability of any microcredit program. Lending institutions must make good loans because default without sanctions will damage the people's commitment and the whole program may collapse.

Generally, the conventional theory of rural development finance shows that rural finance in low-income countries has many inherent failures, including low levels of loan recovery, insufficient savings mobilization, high transaction costs, and distribution bias to relatively wealthier customers. According to Izumida and Duong (2001), exceptional success was found in Vietnam. For example, Central Java's Badan Kredit Kecamatan has shown considerable promise in providing the access to microcredit and the convenience and flexibility desired by poor borrowers while ensuring the credit institution's financial viability by minimizing administrative costs and imposing interest rates sufficient to cover costs and prevent capital erosion. The bank, however, did have problems when it experienced delayed borrower repayments among other failures (Riedinger 1994).

Several factors predispose borrowers to default. Beneficiaries of microcredit tend to use their credit for the same limited range of small-scale activities. In any given situation, it is likely that only a limited range of economically viable small-scale activities is available to the poor and

that there is a limited demand for the product of any particular activity (Bundell 1997). These factors increase poor people's vulnerability to defaulting.

Diagne and Zeller (2001) analyzed the determinants of access to credit and its impact on farm and nonfarm income and on household food security in Malawi. Their report showed that the contribution of rural microfinance institutions to smallholder income can be limited or negative if the design of the institutions and their services do not take into account the constraints and demands of their clients.

A vast body of literature supports the view that borrower characteristics are highly influential determinants of repayment. There also is strong evidence that institutional characteristics are equally important and that both factors need to be taken into account if loan default is to be minimized (Derban, Binner, and Mullineux 2005).

Regarding the poor borrower, ASA noted that difficulty in meeting family expenditures may leave a borrower no option but to spend the loan to cover such expenditures. The same study found that the poor did not invest all loan money in income-generating activities, but spent part of it making payments on previous loans and meeting family expenses.

Basu (1997) examined why institutions remain unable to extend credit to rural poor people. His analysis indicated that, at best, poor peasants can offer as a mortgage an entitlement set comprising only future shares of their harvest—a commodity itself subject to risk. Loan repayment by borrower farmers is influenced by timeliness of input supply, participation in off-farm activities, and yield loss due to natural calamities, among other things (Hundie, Belay, and Demeke 2004). Consequently, lenders cannot advance loans without risking extensive loss of loanable funds.

It is also true that public perception of credit programs is an important factor influencing default. Studies in Africa have revealed a tendency for people to think that funds from the government are free and do not require repayment. Tunisia has had a strong tradition of nonrepayment of government-provided loans (ENDA 2005). Similarly, Makina and Malobola (2004) studied the causes of low repayment for South Africa's Khula Enterprise Finance credits. They found that a major contributing factor for default was beneficiaries' perception that the microloans were free government grants.

With respect to institutional factors, the efficiency of the lending institution can reduce default. In Nepal, for instance, the more efficient microfinance institutions managed by the private sector were found to be better off than government-owned institutions. Efficiency may come from improvement in processes, computerization of management information systems, and improved financial management. Particularly with microcredit, small loans can be profitable only if administrative costs are reduced to a bare minimum. The Kenya Women Finance Trust's strategy is to keep administrative costs down and link the growth in lending to the availability of funds.

Regarding default in joint loan board programs, an impact study carried out by KK Consulting Associates attributed default to poor program management, which resulted in minimal follow-up on borrowers. The report noted that there are no systematic follow-up procedures.

Furthermore, commercial law in Kenya provides a debtor's limitation period. The law states, "If a creditor does not demand repayment of the loan from his debtor within six years of the loan, he cannot enforce his claim in the court in case the debtor refuses to pay" (Hussain 1978).

Elsewhere, lenders of microcredit have been found to have limited, if any, means of mitigating damages in the event of default because poor people lack assets to back up their loans and poor countries lack civil infrastructure (such as adequate court systems) to collect bad debt. Without a safety net for loans in default, microcredit portfolios can fail if borrowers perceive that there are no consequences for defaulting on their loans.

It is also true that there are costs to a lending institution for being in arrears. Arrears deplete portfolio turnover and erode the image of the institution. It has been found that clients of such an institution will inform themselves of the chance that the institution will fail and that debts will begin to grow rapidly. Within the institution, personnel blame each other and the institution's prestige plummets—which again compromises the institution's sustainability.

Strategies to Minimize Defaults

Because of the vulnerability of the microcredit subsector, lending institutions continue to adopt different techniques to improve repayment frequency and grant more credit access to borrowers who pay their loans on time.

The Grameen Bank model is cited widely as the most successful microfinance institution. The Grameen Bank, founded by Muhammad Yunus in Bangladesh, emerged from pro-poor grassroots institutions. According to this model, the prospective clientele is identified after the purpose, functions, and mode of operation are explained to the population of the area covered—usually 15 to 22 villages. Identifying clients in this manner resolves the problem of direct targeting by specifying the members' eligibility requirements on the basis of asset ownership. Indirectly, the model may make the loan amounts small and may lay down conditions (such as attendance at weekly member meetings) so that the nonpoor are discouraged from borrowing (Hulme and Mosley 1996). The meetings reinforce a culture of discipline, routine repayments, and staff accountability. With such innovative practices, Grameen Bank has risen to fame for its performance in targeting and for its low default rates, which average 3 percent.

The Kenya Women Finance Trust believes that small loans are expensive to administer and that the institution can survive only by charging competitive interest rates, lending to women, and keeping defaults to a bare minimum. Women are targeted as clients by this trust because they have been found to have a high propensity to repay.

According to Mann (1993), some lenders prefer known clients to avoid default. People on a loan committee will give preference to an applicant with whom they have dealt previously. Hence, lending institutions will give money based on previous banking experience with the client. The same study also showed that institutions lend to profitable businesses that have cash flow available to pay back the loan.

Another strategy for dealing with default is lending to groups. The collective coming together of individuals is useful in a number of ways, including peer pressure that obliges the members to work within agreed norms. Although studies indicate that such schemes work well if groups are homogeneous and jointly liable for defaults, the practice of denying credit to all group members in case of default is the most effective and least costly way to enforce joint liability (Huppi and Feder 1990).

Three Cs of Microcredit

The literature also describes three "Cs" that should be observed to reduce default when providing microcredit: character, capacity, and capital.

Character refers to the way a person has handled past debt obligations. Paying heed to character includes determining the borrower's credit history and personal background, honesty, and reliability to pay credit debts. Considering a borrower's *capacity* involves determining how much debt he or she can handle comfortably by analyzing income streams and identifying any legal obligations that could interfere with repayment. *Capital* refers to a borrower's current available assets, such as real estate, savings, or investments that could be used to repay debt if income is unavailable.

Lessons from the Literature Review

A number of lessons can be drawn from the literature reviewed. The following lessons are particularly pertinent to this study:

1. Microcredit is important to the growth and development of microenterprises.
2. Lending programs directed toward the poor face unique problems of targeting, distinguishing between creditworthy and not-so-creditworthy borrowers, and monitoring the productive use of loans.

3. Default on repayment poses a major challenge to the survival of microcredit programs, especially in relation to the achievement of a lending institution's broad objectives.
4. There are many factors that predispose poor borrowers to default. Borrowers in poverty have other pressing needs that may interfere with the productive use of the microcredit extended to them. Furthermore, character, capacity, and capital play a role in loan repayment.
5. The public perception that government credit is a grant influences default and is a major challenge to government loan programs. Default rates increase when government is believed to fund a microcredit program.
6. The lending institution should maintain efficiency in terms of improved processes, computerized information systems, and improved financial management to handle its credit programs effectively.
7. Poor management and a lack of effective legal infrastructure to prosecute defaulters encourage default. Without a safety net for defaulted loans, microcredit portfolios can fail if borrowers perceive that there are no consequences for loan default.
8. To deal with default, institutions have adopted strategies for minimizing default in microcredit. These include imposing conditions to which members must adhere, targeting women as borrowers, doing repeat business with borrowers who have good repayment records, and lending to groups to promote joint liability.

Study Methodology

This section describes the methods used in carrying out this study. It explains the data types, sources, and procedures used for the comparative analysis, and it describes the data collection instruments and techniques and the sampling procedures followed.

Study Area

The study covers the Uasin Gishu District, one of the 18 districts in Kenya's Rift Valley Province. According to the Ministry of Planning and National Development's 2002–08 district development plan, the district has 85 trading centers with 8,000 licensed businesses. According to district trade office records, in 2005 alone, 1,516 businesses had been licensed by October.

The choice of study area was made out of an interest in the UGLB's operations and was strengthened by the board's consistency in disbursing loans. An additional factor contributing to the choice of study area was the rapid growth of microfinance institutions in the district.

Data Types and Sources

Both primary and secondary data sources are used in this study. Primary data were collected through questionnaires. Other sources of data include information taken from official reports, file records, and statistics issued by the relevant institutions. In addition, secondary documented data were obtained from both published and unpublished literature related to the topic.

Sample Size and Sampling Techniques

The UGLB has made a total of 26 disbursements since its inception in 1973. This study, however, focuses on the period 2001–04 during which a total of three disbursements was made (2001, 2002, and 2004). A total of 161 clients benefited from the board's work over that period. Of that total, a sample of 100 clients was selected for data collection concerning the reasons for default among those who did not repay and those who repaid slowly, and concerning the factors influencing timely repayment by the regular borrowers. All borrowers were assigned to one of three categories: defaulters, slow repayers, and regular borrowers.

Stratified and systematic sampling techniques were used. Stratified sampling guaranteed representation from each disbursement cohort at one level and representation of regular borrowers, slow repayers, and defaulters. Systematic sampling also was applied to capture clients as they came to repay loans.

Purposive sampling was done to provide the UGLB's information. Four board staff directly involved in the day-to-day running of the loan program were interviewed.

Data Collection Instruments

Several data collection instruments were used during the study. Primary data were generated from two types of questionnaires. The first type comprised two questionnaires administered to defaulters, slow repayers, and regular borrowers. The questionnaires had four sections: section A inquired about the borrower's personal and business details; section B sought information on causes of default or timely repayment; section C dealt with business performance; and section D addressed the effect of loan repayment on the enterprise, family, and community.

The other type of questionnaire was used in interviews with board officials. It had three sections: section A inquired about the official's personal details, including professional qualifications, work experience, and main responsibilities; section B sought the interviewee's considered opinion on causes of default and factors influencing loan repayment; and section C dealt with the impact of loan repayment on the UGLB scheme.

Secondary data were obtained from a number of data instruments used by the trade office. These instruments included the loan application form, the appraisal of the applicant, and the loan agreement form. The other tool was the account ledger for each group to which funds were disbursed.

Data Collection Procedures

The data were collected at two levels. Primary data were obtained by administering the questionnaires to selected loan beneficiaries who defaulted and to borrowers who completed their loan repayments.

Prior to its use in the field, the questionnaire was tested using board clients in each of the three categories who are based in the town of Eldoret, the administrative center of Uasin Gishu District. Following this testing, research assistants went to the field under the guidance of an officer from the trade office to help identify borrowers. One research assistant was based at the trade office to administer the questionnaires to board clients as they came to repay their loans. This in-office process captured eight borrowers who were either slow repayers or defaulters.

The board clients' questionnaire captured data on their demographic and socioeconomic characteristics, business characteristics, and causes for default or timely repayment. For business classifications, the study adopted the classifications of the Trade Licensing Act, Cap 497, of the laws of Kenya.

Additionally, a questionnaire was administered to the board staff to find out the board's considered opinion on the causes of default and the factors influencing repayment. The questionnaire's three sections asked about board officials' professional qualifications, their duties, and the loan program's performance.

Relevant secondary data gathered from the loan application forms, the applicant appraisal forms, and the account ledgers included information on clients' locations, demographics, business attributes, recommended loan amounts, and repayment plans.

Data also were gathered from the account ledgers maintained by the trade office. The books provided up-to-date loan repayment data for each client. Evaluating the ledgers alongside the approved repayment plans of respective borrowers enabled us to identify regular borrowers, slow repayers, and defaulters.

Data Analysis

The study used a comparative analysis approach to investigate the causes of default in government microcredit.

To facilitate data analysis, 100 questionnaires collected were serialized and coded before being entered into Microsoft Excel software. After data cleaning, only 92 questionnaires were found suitable for analysis. Data then were exported to SPSS statistical analysis software. Descriptive analyses tools, such as frequencies and percentages, were used to study the repayment performance and other relationships of interest. In addition, various qualitative analyses were applied to establish causes of default in repaying the board's credit. Secondary data concerning board clients' repayment performances were entered in Excel spreadsheets to compute relevant statistics.

Study Findings

This section presents the study's findings on the causes of default in a government microcredit program—specifically, the UGLB. The average repayment delay period and default rates are estimated and factors that contributed to loan default and slow repayment are presented.

UGLB Clients' Profile

Ninety-two clients who received loans from the UGLB during the study period were analyzed. Two-thirds of the clients were repeat borrowers (having received other loans before or during the study period). About 70 percent of the clients were male. All clients were aged 28 to 79 years, with a mean of 47. Sixty-five percent of them were aged 40–59 years. Figure 1.1 shows the age distribution of the study sample.

The education level of borrowers ranged from no education to postsecondary training. Ninety-one percent of the clients had either primary or secondary education, with 51 percent having secondary education. The great majority of the clients were married (86 percent); approximately 10 percent were single; and 4 percent were separated, divorced, or widowed.

The amount of money disbursed to each client ranged between K Sh 20,000 and K Sh 50,000. These loans were to be repaid over a period ranging from 12 to 18 months. At the time of the study, outstanding balances per slow-repaying or defaulting client went as high as K Sh 44,000. Some clients had made no payments at all on their loan accounts.

Board clients had varied amounts of business experience—from as little as six months to as much as 43 years. The common type of businesses run by 73 percent of board clients fell mainly in regulated trade (retail). Manufacturing, motor vehicle repair, hotel and catering services, and miscellaneous businesses together amounted to only 27 percent.

Figure 1.1. *Age Distribution of Study Cohort*
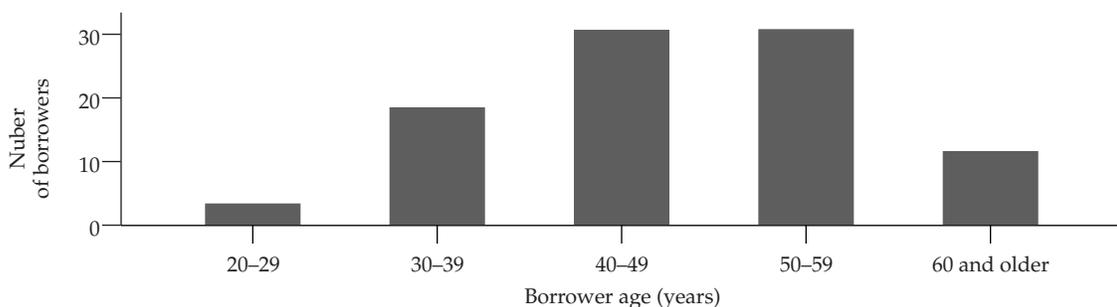
Source: Author's compilation.

With respect to income levels, 65 percent of those interviewed said that their income level had improved to either an average or high extent since receiving the trade loan. About 85 percent had personal income above K Sh 2,000 per month, with approximately 45 percent reporting personal monthly income of more than K Sh 8,000. The major source of income among the borrowers was their business enterprise, although 34 percent had diversified, with farming or employment as their major source of income.

Loan Default Analysis

Because both slow repayment and default rates negatively affect the UGLB's performance, identifying the average repayment delay and the default rate is important.

AVERAGE REPAYMENT DELAY. Of the 92 UGLB beneficiaries studied, 45 exceeded the repayment periods stated in their loan agreements. The repayment delays described in figure 1.2 are the months between the agreed repayment periods and actual completion of the loans by the slow repayers. The analysis revealed that slow repayers delayed repaying their loans for one to 23 months. Most of them cleared their loans within five months after the expiration of the loan agreement period.

Table 1.5 provides the descriptive statistics of the slow repayers over the study period. The repayment delay was calculated as the number of months delayed in completing a loan, divided by the agreed repayment period in months, and then multiplied by 100. The results indicate that the minimum repayment delay occurred among those who were to repay in 18 months (they delayed an average of one month); the maximum delay occurred among those who were to repay in 12 months (they delayed an average of 23 months). Therefore, the average repayment delay among the UGLB's slow-repayment borrowers was approximately 31 percent longer than the agreed period. In other words, a slow-repayment board client who received a loan to repay in 12 months was more likely to repay it in 16 months, a client given a loan to repay in 18 months was more likely to repay in about 24 months, and so on.

REPAYMENT AND DEFAULT RATES. In this study, it was important also to compute the study cohort's default rate for the UGLB scheme. Table 1.6 shows the board's performance in 2001, 2002,

Figure 1.2. *Repayment Delays among Study Cohort Slow Repayers*

21–23 months (2.2%)
11–15 months (6.7%)
6–10 months (28.9%)
1–5 months (62.2%)
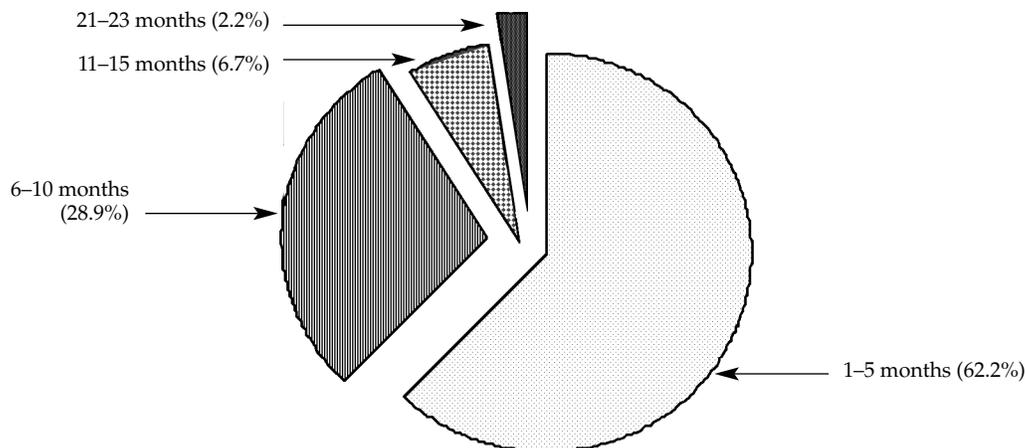
Source: Author's calculations.
Note: Of the 92 borrowers studied, 45 failed to adhere to their repayment schedules. This chart shows their periods of arrears.

Table 1.5. *Descriptive Statistics on Repayment Delays among Slow Repayers*

Statistic	Number of cases	Minimum	Maximum	Mean	SD
Actual repayment period	45	13	35	20.51	4.794
Repayment delay (% beyond agreed period)	45	5.56	191.67	31.4392	32.746
Delay in months	45	1	23	4.78	4.512

Source: Author's calculations, based on trade office records, Eldoret, Uasin Gishu District.
Note: SD = standard deviation.

Table 1.6. *UGLB's Repayment and Default Rates, Study Years*

UGLB performance	2001	2002	2004
Disbursement (K Sh)	1,895,000.00	1,300,000.00	3,005,000.00
Recovered funds at the expiration of loan agreement period (K Sh)	1,476,555.01	873,626.47	1,836,281.23
Outstanding balance (K Sh)	418,444.99	426,373.53	1,168,718.80
Default rate (%)	22.08	32.80	38.89

Source: Author's calculations, based on trade office records, Eldoret, Uasin Gishu District.
Note: UGLB = Uasin Gishu District Trade Development Joint Loan Board.

and 2004 by comparing total disbursements with total repayments and outstanding balances at the ends of the loan agreement periods. The default rate, therefore, is based on outstanding balances at the ends of the agreed repayment periods. It is clear from the outstanding balances and amounts disbursed that the board experienced default rates of 22 percent, 33 percent, and 39 percent for 2001, 2002, and 2004, respectively. The results give rise to an overall average default rate of approximately 31 percent.

Slow-Repayment Borrowers

Borrowers who exceed their agreed repayment schedules are viewed as a type of defaulter because they did not repay their loans on time. Therefore, it was important in this study to establish the causes of slow repayment. Figure 1.3 shows the causes for default stated by the slow repayers. It emerges that diversion of funds and poor business performance were the key causes of untimely loan repayments. Other borrowers were affected by business closure or by having many dependents.

Defaulters

Using the responses gathered from the questionnaires, the study established a number of causes for default among UGLB clients. Figure 1.4 provides a frequency distribution of the causes of default among the board's clients.

Thirty-six percent of the defaulters attributed their nonrepayment to poor business performance. Twenty percent cited domestic problems, and another 10 percent admitted having diverted the funds to other unprofitable uses. Poor timing, tenancy problems, theft, and business closure also were named as causes for default, although on a small scale.

The "other" causes (10 percent) of nonpayment identified among the defaulting borrowers included harsh economic conditions, stiff competition, government policy banning certain activities, servicing of other loans, and bad debts on services offered to their customers.

Figure 1.3. *Causes of Default among Slow Repayers*

Other (5%)

Many dependents (5%)

Business closed (5%)

Poor business
performance (35%)

Diversion of funds
(50%)
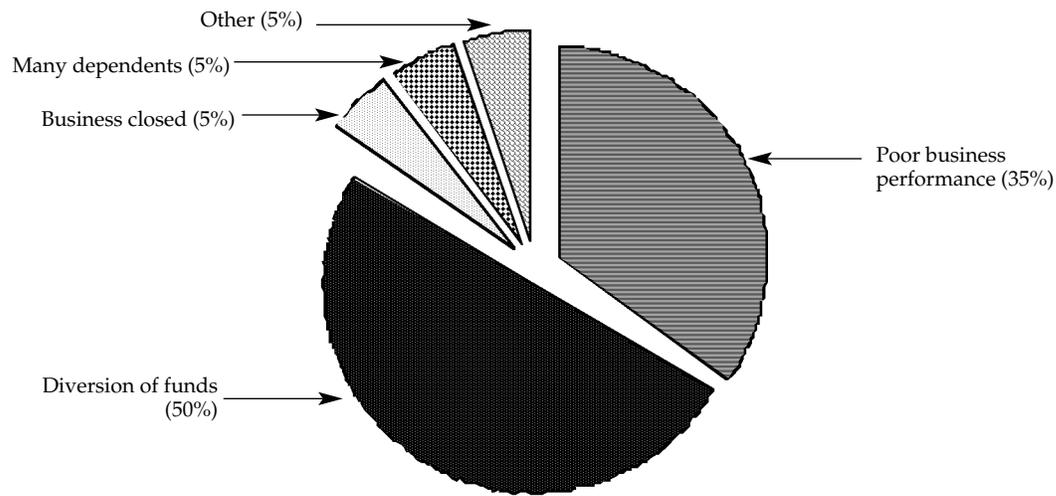
Source: Author's calculations, based on responses to study questionnaires.

Figure 1.4. *Specific Causes of Default among Defaulters*

Other (10%)

Theft/robbery (6%)

Many dependents (4%)

Business closed (2%)

Tenancy problems (6%)

Poor timing (6%)

Poor business
performance (36%)

Domestic problems (20%)

Diversion of funds to
unprofitable use (10%)
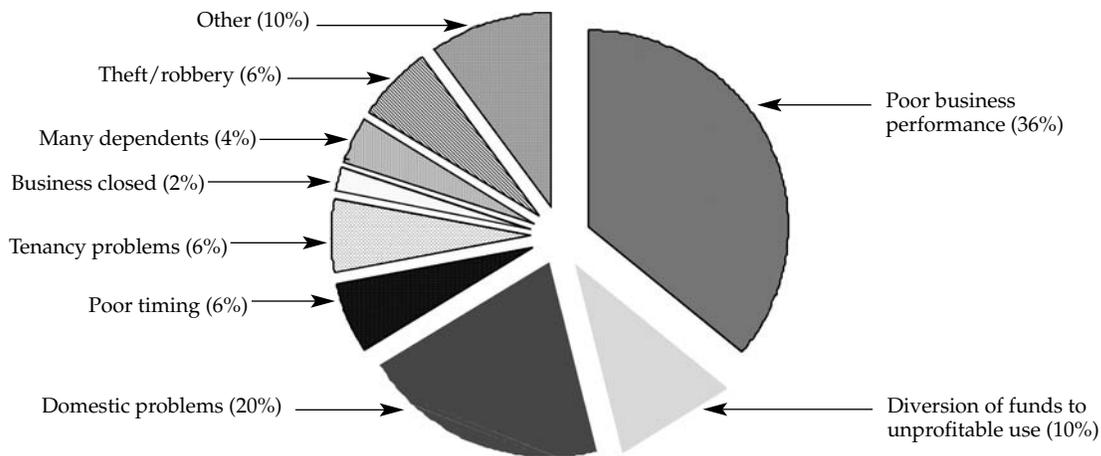
Source: Author's calculations, based on responses to study questionnaires.

Owing to the sensitive nature of the issue of default, the study endeavored to find out whether household characteristics contributed to nonrepayment. The study was interested in establishing any relationship between a borrower's number of dependents and the cause of default, or between the major source of income and the cause of default. Table 1.7 shows that about three-quarters of the defaulters had five or more dependents, and that approximately 60 percent of the borrowers relied on the microenterprise for most of their income. Table 1.8 provides cross-tabulations between the number of dependents and the cited cause of default and between the major source of income and the cited cause of default.

The cross-tabulations show that many defaulters who had a large number of dependents also experienced poor business performance, diverted funds, or had domestic problems. It is surprising, however, that only two defaulters cited "many dependents" as the cause of default (both of whom had five or more dependents). The associated p-value of the cross-tabulation between many dependents and cause of default was 0.534 (53.4 percent), meaning that many dependents and cause of default are statistically independent.

Table 1.7. *Household Characteristics of UGLB Defaulters*

Characteristic	Frequency	Percent	Characteristic	Frequency	Percent
Number of dependents			*Major source of income*		
1	0	0	Farming	15	30
2	2	4	Business microenterprise	29	58
3	7	14	Employment	5	10
4	5	10	Other (casual worker)	1	2
5 or more	36	72			

Source: Responses to study questionnaires.

Table 1.8. *Relationships between Household Characteristics and Causes of Default*

Number of dependents	*Cause of default*						
	Poor business performance	*Diversion of funds*	*Domestic problems*	*Tenancy problems*	*Many dependents*	*Other*	*Total*
2	0	0	1	0	0	1	2
3	3	0	2	0	0	2	7
4	3	0	0	1	0	1	5
5 or more	12	5	7	2	2	8	36
Total	18	5	10	3	2	12	50

Major source of income	*Cause of default*				
	Poor business performance	*Diversion of funds*	*Domestic problems*	*Other*	*Total*
Farming	5	3	3	4	15
Microenterprise	12	2	7	8	29
Employment	1	0	0	5	6
Total	18	5	10	17	50

Source: Responses to study questionnaires.

Table 1.8 also shows that many defaulters who relied for income on the microbusiness alone experienced poor business performance. Because approximately 60 percent relied on the business as the main income source, the vulnerability of the microenterprise to poor business performance was revealed. The cross-tabulation for major source of income and cause of default had a *p*-ratio of 0 percent, which indicated that the major source of income and the cause of default are statistically dependent.

Comparative Analysis of the Causes of Default among Slow Repayers and Defaulters

The analysis of causes of default revealed that there are variations on causes of default among the two categories—slow repayers and defaulters. Table 1.9 compares the percentage of respondents in each category who cited each reason as the main cause for default. The results indicate that poor business performance is a key cause of default identified by both slow repayers and defaulters. Although half of the slow repayers attributed their default to diversion of funds to unprofitable uses, only 10 percent of the defaulters did so. Hence, although diversion may increase the possibility for defaulting, it may not be the major cause. Domestic problems and other causes (including harsh economic conditions, stiff competition, servicing of other loans, and bad debts) also were important, especially among defaulters.

Table 1.9. *Comparison of Causes of Default between Slow Repayers and Defaulters*
Percent

Cause of default	Slow repayers	Defaulters
Poor business performance	35	36
Diversion of funds to unprofitable uses	50	10
Business closure	5	2
Many dependents	5	4
Domestic problems	0	20
Other	5	28

Source: Responses to study questionnaires.

UGLB's Perspective on the Causes of Default

The UGLB believes that some defaults occur because of limitations of the board, whereas other defaults are borrower driven. Accordingly, therefore, a number of factors were identified as causes of loan default from the board's perspective.

Board employees were unanimous in their belief that failure to prosecute defaulters was an important cause of loan default. Default cases are referred to the state counsel based in Kisumu, a town located in another province, because the state counsel in the local district does not handle civil cases. Furthermore, proper follow-up of clients is constrained by inadequate funding for operations and maintenance resources. For instance, transport operating budgets have been declining, a situation that does not facilitate consistent monitoring or follow-up on defaulters. Chances of default also increase when loan amounts given are lower than the amounts requested. And the board's institutional structure was described as too rigid and thus not responsive to changing client needs.

Board members also believe the length of time it takes for a potential borrower to apply and get the loan has an effect on the use and repayment of the loan. In the UGLB program, it takes at least six months for an applicant to apply and receive a loan.

The board also acknowledges that its records on clients are inadequate for efficient program management. Although the board has computer facilities, those facilities do not contain appropriate software to process borrower information promptly or to track potential defaulters. Data relating to borrowers are manually kept in files and account ledgers, but those files and books were found to be too bulky and tedious for the board's sole clerical officer to handle. Because basic data on loan repayment are not in a readily and conveniently available format, cases of loan over- and underrepayment exist.

Regarding loan repayment, default was associated with diversion of funds to unprofitable uses, like paying school fees. Other factors included a lack of discipline in the use of working capital, poor management skills, and poor business performance. In some cases, defaults were believed to be a problem of attitude, with beneficiaries assuming that government funds are grants and need not be repaid.

The study also found that board members do have measures to deal with various categories of default. Cases of chronic default are forwarded to the state counsel for prosecution. Some occasional defaulters are threatened with sale of their security to recover the outstanding balances, and others simply are counseled on the importance of repaying the loan on time. These measures have improved loan recovery, albeit marginally. Despite the measures, the board believed that the default trend is increasing.

Factors Influencing Repayment of Loans among Regular Borrowers and Slow Repayers

To establish factors that influenced repayment of loans disbursed by the UGLB, questions were posed to both regular and slow-repaying borrowers. The regular borrowers, who made timely

Figure 1.5. Reasons for On-Time Repayment among UGLB Borrowers
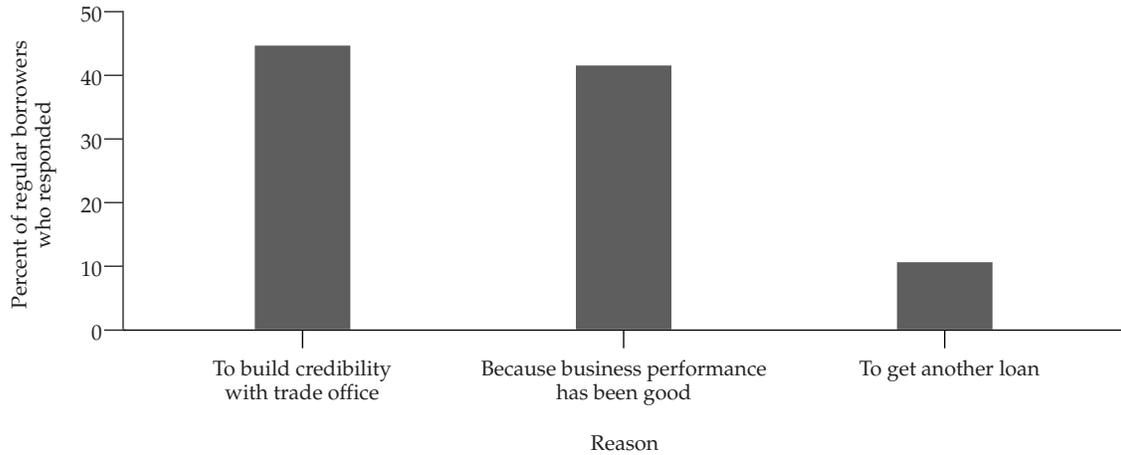
Source: Author's calculations, based on responses to study questionnaires.

payments in accordance with their agreed payment schedules, were asked to state what prompted them to repay on time; and the slow repayers were asked to state what caused them to repay the remaining balance after they failed to repay the loan as scheduled. The study sought to discover links between the motivations for repayment and default.

Figure 1.5 shows key factors found to influence board clients to repay on time. As the figure illustrates, regular borrowers repaid their loans on time for three reasons: (1) because they wished to build credibility with the trade office (46 percent), (2) because they associated timely repayment with good business performance (42 percent), and (3) because they wished to get another loan (12 percent).

The study also was keen to discover what triggered slow-repaying borrowers finally to repay the outstanding balance. Figure 1.6 shows the stated reasons for eventual repayment of a trade loan. It reveals that 55 percent of the slow repayers eventually repaid because of a desire to fulfill the outstanding obligation. However, 30 percent repaid because they urgently needed

Figure 1.6. Reasons for Eventual Repayment of the Loan by Slow Repayers
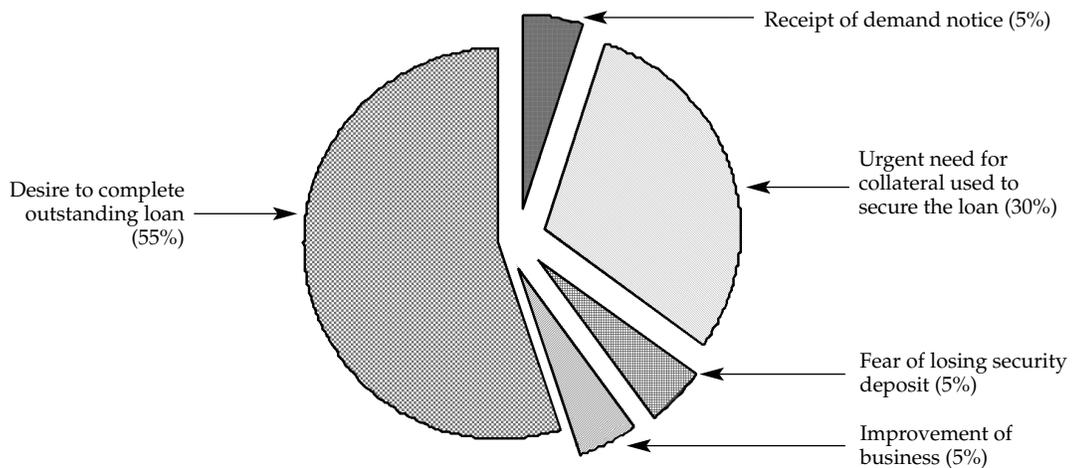
Source: Author's calculations, based on responses to study questionnaires.

collateral deposited at the trade office, and 5 percent repaid because they feared losing that security deposit. Issuance of demand notices and improved business triggered full repayment of the loan for 10 percent of the slow repayers.

Effect of Repayment on Enterprises, Families, and the Community

The study also sought to discover what repayment burdens placed on the enterprise might cause default. Responding to study questions, one-third of the study cohort indicated repayment had no effect on the enterprise. The remaining two-thirds, however, said that repayment had led to a reduction in their stock levels. Some said that they were not able to make any savings because they used profits to repay the loans. Other borrowers said that they were using means beyond business to repay their loans. Some loan recipients even admitted suffering from depression as a result of the repayment burden, and they said the depression was affecting relationships with customers and was leading to poor business performance. As a result of repayment, some businesses had closed their doors. Those who were repaying were doing so to maintain trust with the loan office or to avoid prosecution. Some borrowers explained that repayment was a burden only when sales were low.

With respect to the burden on borrowers' families, less than 20 percent said that repayment had no effect on the family. The remaining 80 percent said that repayment reduced family income and that children's school fee payments might be compromised. They noted that repayment was expensive because they had to spend a lot more on transportation. The impact of repayment was felt greatly during times of ill health or other emergencies. Some respondents also revealed that they sold property to repay their loans. Families who repaid poorly said that they lived in fear and suffered psychologically when they saw any government vehicle. For that reason, they tried to repay so as to maintain a good relationship with government.

Sixty-six percent of the borrowers also were aware of the effect of their repayment on the community. They said that community members benefited by loan repayments. Some respondents noted that good repayment encouraged other community members to take loans and start businesses that provided needed goods and services to the community. They also pointed out that loan defaults cause the community to lose those goods and services and that poor loan repayment makes community members hesitant to take any loans for development.

Conclusions and Recommendations

This final section of the report presents conclusions drawn from the findings and offers suggestions to strengthen the UGLB and better equip it to deal with the problem of slow repayment and default.

Conclusions

Study findings revealed that default on loans disbursed by the UGLB is strongly related to the major source of income. Borrowers' major source of income was found to be the business enterprise, and the predominant cause of default was poor business performance. Therefore, it can be concluded that borrowers who depend on their poorly performing businesses default.

Timely repayment of loans disbursed by the board, on the other hand, is influenced by good business performance and by the desire to build credibility with the trade office. Among slow repayers who eventually repay their loans, however, repayment motivations include the desire to fulfill their outstanding obligations and the urgent need to reclaim or the fear of losing the security deposited as collateral for the loan. To a lesser extent, demand notices influenced repayment among slow-repaying borrowers.

Business performance in this study is viewed in terms of enterprise profitability. Therefore, board clients who had profitable businesses were able to repay their loans, whereas business

losses led clients to default or repay slowly. The effect of poor business performance was confirmed further by the revelations of some borrowers that they used sources of income other than their microenterprises to repay loans. This finding indicates that borrowers who lack other sources of income easily could default if their businesses performed poorly.

Notwithstanding those factors, however, and drawing from the literature reviewed, this study observed that loan default averaging 31 percent is high. Sustainable microfinance programs, such as the Grameen Bank, were found to have low default rates (roughly an average of 3 percent). Therefore, reducing the UGLB's default rate is a survival priority for the loan program. Sufficient repayment rates are necessary to facilitate redisbursement of financing, and they contribute to achieving the board's objectives.

Findings of this study indicated, however, that there is a mismatch between the board's mandate and its capacity to handle core functions. It has a small staff whose operations are further constrained by limited operations and maintenance resources. As a result, although the UGLB has the potential to perform well in providing and recovering government microcredit disbursements, it lacks the necessary support.

This study also concluded the board's manual information systems are inadequate. For instance, manual recordkeeping is not suitable for effective program management. With the records as they presently are kept, the board cannot detect slow-repaying borrowers and potential defaulters—a fact further confirmed by the small number of borrowers who have received loan repayment demand notices. Although not many borrowers were served with demand notices, the notices did trigger repayment whenever they were used.

This study further observed that not prosecuting defaulters contributed to the rising trend in program loan defaults. Therefore, the options open to the board in dealing with either slow repayers or defaulters are ineffective. Default rates are likely to rise and may negatively affect the board's operations.

The study also found that delays in disbursing funds to borrowers may be as great as six months from the time a loan application is filed. Timely disbursement enables a borrower to match acquired resources to business needs. With such delays, there is a possibility that business priorities and market conditions will have changed by the time funds are received. That situation can lead to a diversion of funds for some unprofitable uses and so to an increased chance of loan default.

Recommendations

This study has found that improving the UGLB's performance is a prerequisite to making it more effective in carrying out its mandate and providing technical support to microenterprises so as to improve their profitability. To that end, the UGLB should take the following actions:

1. Strengthen its management information systems to produce up-to-date loan repayment statements for borrowers and to enable early detection of potential default and slow-repayment problems. Doing so will help the board take quick follow-up actions, such as providing debt counseling or issuing demand notices.
2. Strengthen its staff by enhancing the capacity of its computer applications. This will enable optimal use of the available computer facilities, speed up loan processing, and ensure timely disbursements.
3. Intensify its follow-up on borrowers to improve recovery of outstanding loan balances accruing to slow repayers and to prosecute defaulters.
4. Revise its borrower appraisal instrument to help identify deserving but vulnerable microentrepreneurs. Vetting should determine how much debt the borrower can handle comfortably, his or her income streams, and any other obligations that might interfere with repayment. Doing so can enable the board to provide the borrower with appropriate counseling and support to avoid repayment default.

5. Carry out a workload analysis to establish the optimal trade office staffing levels for consideration by the Ministry of Trade and Industry.

The Ministry of Trade and Industry should take the following actions:

1. Increase the staffing levels in the trade office to facilitate efficient service delivery in terms of quick processing of applications, disbursement of loans, and monitoring of loan usage.
2. Provide to UGLB sufficient resources for operations and maintenance to permit efficient monitoring of borrowers and to cover the expense of prosecuting those who default.

References

Basu, S. 1997. "Why Institutional Credit Agencies Are Reluctant to Lend to the Rural Poor: A Theoretical Analysis of the Indian Rural Credit Market." *World Development* 25 (2): 267–80.

Bundell, K. 1997. "Microcredit and the Needs of the Poor: The Limitations of Small Loans in Ending Poverty." Christian Aid, London. http://www.microfinancegateway.com/files/2323_file_02323.htm.

Cornia, G. A., and F. Stewart. 1991. "Two Errors of Targeting." Paper prepared for the World Bank Conference on Public Expenditures and the Poor: Incidence and Targeting, Washington, DC, June 17–19, 1992.

Derban, W. K., J. M. Binner, and A. Mullineux. 2005. "Loan Repayment Performance in Community Development Finance Institutions in the UK." *Small Business Economics* 25 (4): 319–32.

Diagne, A., and M. Zeller. 2001. *Access to Credit and Its Impact on Welfare in Malawi.* Washington, DC: International Food Policy Research Institute.

ENDA (Environmental Development Action in the Third World). 2005. "Microcredit for Disadvantaged Suburbs of Tunisia." Dakar, Senegal.

Hulme, D., and P. Mosley. 1996. *Finance Against Poverty.* London: Routledge.

Hundie, B., K. Belay, and M. Demeke. 2004. "Factors Influencing Repayment of Agricultural Input Loans in Ethiopia." *Savings and Development* 117–44.

Huppi, M., and G. Feder. 1990. "The Role of Groups and Credit Cooperatives in Rural Lending." *World Bank Research Observer* 5 (2): 187–204.

Hussain, A. 1978. *A Textbook of General Principles and Commercial Law of Kenya.* Nairobi, Kenya: East African Educational Publishers.

Izumida, Y., and P. Duong. 2001. "Measuring the Progress of Rural Finance in Vietnam." *Saving and Development* 25 (2): 139–66.

Makina, D., and L. Malobola. 2004. "Impact Assessment of Microfinance Programmes, Including Lessons from Khula Enterprise Finance." *Development Southern Africa* 21 (5): 799–814.

Mann, P. 1993. Forum on Barriers Facing Banks in Lending to Many Small and Disadvantaged Businesses. Entrepreneurial Institute, Florida International University, Miami. http://www.gdrc.org/icm/micro/bank-barrier.html.

Ministry of Planning and National Development, Republic of Kenya. 2003. "Economic Recovery Strategy for Wealth and Employment Creation 2003–2007." http://www.planning.go.ke/.

Ministry of Trade and Industry, Republic of Kenya. 2005. "Monitoring of Joint Loan Boards Scheme—Core Poverty Programs/Projects Brief." Central Planning Unit, Nairobi.

Nasiuma, B. K. 2003. "Impact of Uasin Gishu District Trade Development Joint Loan Board's Interventions on Performance of SMEs in Uasin Gishu District." Photocopy.

Poverty Eradication Commission, Republic of Kenya. 2002. "Guidelines for Identification, Funding, and Management of Poverty Eradication Commission (PEC)–Supported Community-Based Poverty Initiatives." Revised draft.

Riedinger, J. M. 1994. "Innovation in Rural Finance: Indonesia's Badan Kredit Kecamatan Program." *World Development* 22 (3): 301–13.

UN (United Nations). 1997. "The Role of Micro Credit in Eradication of Poverty." Report of the Secretary-General, New York. http://www.un.org/documents/ga/docs/53/plenary/a53-223.htm.

2

Corruption Diagnostics: Prescribing a Reform Agenda for Indonesia

Carolina Pondang Austria and Pratibha Krishnamurthy

This report offers an analysis of the causes of corruption, including social and political causes and those arising from markets and their interactions. It introduces a framework for systematic and disciplined analysis of these causes to help identify principal factors contributing to corruption and those factors leading to it. Corruption in this framework is analyzed as a function of high rent and low risk—each a composite of various factors that are analyzed to identify the primary root of corruption. This framework is suitable for use by policy planners who can allocate resources judiciously to tackle the problem of corruption and obtain maximum benefit from their investment in development. The report specifically addresses the case of Indonesia.

Public corruption, defined as the misuse of public office for private gain, is a major issue in the world. Although some people have argued that corruption may be beneficial in that corrupt practices "grease the wheels of commerce" and that bribes provide an incentive for government employees to work harder, the more prevalent opinion is that corruption is detrimental to growth and development because it results in economic distortions and inefficiency (Kaufmann and Wei 1999; Mauro 1995; Shleifer and Vishny 1993).

The economic losses caused by corruption are significant. The World Bank estimates that more than $1 trillion is paid in bribes each year. This figure excludes losses from embezzlement of public funds and theft of public assets (World Bank n.d.). In addition to such obvious and immediate losses, there are latent and lingering economic costs. Mauro (1995) found that corruption results in lower investments, and thereby lowers economic growth. In a study of 94 countries, an increase in corruption averaging 2.38 points on a 10.0-point scale would decrease a country's annual investment by 4.0 percent of gross domestic product (GDP) and would decrease annual growth of GDP per capita by 0.5 percent (USAID 1999, citing Mauro 1995). Stated more directly, *corruption causes poverty.*

This strong link between corruption and poverty highlights the importance of developing a strategic response in fighting corruption in developing countries. The economic benefits are enormous, and they redound to the people who need them the most—poor people. Having said that, however, we must point out that corruption is a complex problem. There are no easy solutions to poverty, and most countries that aspire to eradicate it have to take into account severe time, resource, and political constraints.

In a 2005 Harvard University lecture, Lawrence Summers noted that, in developing economies, the higher the stakes and the tighter the constraints, the greater the need for a strategic and

methodologic approach. In this report, that is the need we seek to address. We present a framework that can be used in analyzing the causes of corruption and prescribing a suitable policy response. The framework, "Corruption Diagnostics," aims to provide a structure and methodology for diagnosing the causes of corruption—a diagnosis that is crucial in formulating the appropriate policy response.

Another objective of this study is to analyze corruption in Indonesia. We chose Indonesia as our case country for two reasons: First, the Indonesian government recently launched a reform program, supported by the World Bank, that is aimed at fighting corruption, and we would like to contribute to this effort. Second, corruption in Indonesia is perceived as severe and pervasive, and is thus a good case example for other developing countries struggling with similar problems. Corruption has been cited as the country's binding constraint to growth (Austria et al. 2005), the root of all its problems (Hofman, Rodrick-Jones, and Thee 2004), and the reason why Indonesia fell prey to the 1997 Asian Crisis and is a laggard among its peers in recovering from the crisis (Stern 2003).

Evidence of the severity of corruption is compelling. In 1995, Indonesia ranked as the most corrupt country in Transparency International's Corruption Perceptions Index; since then, it consistently has been ranked among the 10 most corrupt countries, with a score below 3 on a 10-point scale. According to the Global Corruption Barometer (TI 2005), most national institutions within Indonesia are perceived to be largely corrupt, with political parties, the parliament, the judiciary, and the police system featuring among the most corrupt institutions. The report on the investment climate and productivity study for Indonesia, prepared jointly by the Asian Development Bank and the World Bank, highlighted the fact that corruption is a primary area of concern, deterring economic and social development and undermining growth by distorting the rule of law and weakening the institutional foundations of the society (ADB 2005).

This report will be structured as follows: we will discuss the Corruption Diagnostics framework in the second section, our analysis of Indonesia in the third section, our policy recommendations in the fourth section, and our conclusions at the end.

The Corruption Diagnostics Framework

We posit that, in many ways, analyzing the primary roots of corruption is similar to analyzing the binding constraints to growth. Both corruption and growth involve multiple and sometimes endogenous variables. Factors determining the levels of corruption and growth are both time specific and country specific. Corruption strategies, similar to growth strategies, should be tailored to local circumstances and constraints. The framework for analyzing corruption therefore can benefit by drawing from the rich body of literature on analyzing growth.

With that in mind, as we designed our framework we referred to literature on growth, especially to the work on growth diagnostics by Hausmann, Rodrik, and Velasco. In particular, we derived a stylized model similar to the one they presented (2005, pp. 5–7).

The Model

An economy that suffers from corruption is characterized by conflicting social and personal returns. Individuals try to maximize their personal returns, but their efforts result in a distortion within the various sectors and cause a decrease in the net societal return. The difference between the returns to the individual and those to the society can be said to be the loss or waste resulting from corruption.

Let this loss be denoted by $\mu = \{\mu_1, \mu_2, \ldots, \mu_k\}$, where μ_i represents the loss from corrupt activity i. The sequence of the corrupt practice can now be represented by the equation

$$\rho_i^p (\mu, \ldots) = \rho_i^s (\mu, \ldots) + \mu_i, \tag{2.1}$$

in which $\rho_i^p(\mu, \dots)$ and $\rho_i^s(\mu, \dots)$, respectively, represent the returns to the private agent and the society because of corrupt activity *i.* Equation (2.1) indicates that loss and societal return are inversely proportional to each other, and it results in the following constraint:

$$\rho_i^p(\mu, \dots) - \rho_i^s(\mu, \dots) - \mu_i = 0. \tag{2.2}$$

Our objective is to minimize μ_i so that the average difference given by υ between private and societal returns is minimized. This results in the following equations:

$$L = \upsilon - \lambda\,[\mu_i - (\rho_i^p(\mu, \dots) - \rho_i^s(\mu, \dots))]. \tag{2.3}$$

$$\frac{d\upsilon}{d\mu_i} = -\lambda_i + \sum_i \lambda i\, \frac{\partial[\rho_i^p(\mu, \dots) - \rho_i^s(\mu, \dots)]}{\partial\mu_i}. \tag{2.4}$$

In the above equations, $\lambda_i >\,= 0$, $i = \{1, 2, \dots,\ k\}$ are the Lagrange multipliers for the constraint associated with each of the interactions with other sectors. The first term on the right side indicates the direct effect of the activity *j* on the specific sector, and the second term denotes the overall effect on all of the other sectors.

The Reform Options

Given the above model, we now consider the options available for controlling corruption:[1]

1. *Wholesale corruption targeting and reform measures:* This strategy implies that corruption is tackled simultaneously in all its forms, and that all losses are eliminated. The strategy includes knowledge of all different interactions that can result by cutting corruption losses, and suitable precautionary measures are taken to avoid any unconstructive effects on the system.
2. *Targeting corruption to the extent possible:* This strategy involves a "laundry list" of reform measures, and all losses expected in a general corruption scenario are addressed.
3. *Second-best reform approach:* This strategy involves selecting specific sectors and cutting losses such that the resulting interactions involve only positive results. The approach avoids partial reform in those sectors that are likely to lead to negative fallout.
4. *Targeting the largest losses:* This approach targets sectors with the largest losses and works on them to make them equal to the next-largest loss and so on, following the Concertina methodology in trade (Hausmann, Rodrik, and Velasco 2005).
5. *Focusing on the primary root:* This approach focuses on the factor that leads to the greatest losses in the economy and that will lead to the most positive interactions in the society. Identifying this sector requires identifying the primary root, which actually will lead to the largest λ_j in the Lagrangian equation above. This strategy is expected to be most effective because it avoids many of the drawbacks observed in the other four approaches (which require extensive knowledge about the implications of targeting losses and resulting interactions), and it avoids the waste of resources and reform efforts. Sector selection will depend on three criteria: (a) the existence of widespread corruption in the sector, (b) the ability of the sector to influence other sectors and positive overall interactions resulting from targeting the sector, and (c) the existence of institutional weaknesses/natural affiliation toward corruption in the sector.

---

1. The model that we derived was not very different from that presented for growth diagnostics by Hausmann, Rodrik, and Velasco (2005, pp. 6–8). The reader will note striking similarities in the options available for reform.

Development of a Corruption Diagnostics Framework

From the model described above, we conclude that the best way to fight corruption is to target the primary roots—those variables that contribute most to the prevalence of corruption in terms of their extent and the interactive effects they have on other variables. When addressed, these primary roots lead to the most substantive reduction in corruption. This conclusion now deepens our inquiry—what are these variables?

Leite and Weidmann (1999) proposed that, if we view corruption as an illegal activity, we can use Becker's (1968) theory that the probability of committing a crime depends on the penalty imposed and the risk of being caught. We extend that proposition and state that corruption is a factor of the rent[2] and the risk of getting caught: corruption = f(rent, risk). The *rent* in that equation refers to the uncompensated value extracted from others by manipulation of the economic environment—often including regulations or other government decisions.[3] *Risk* is the probability of getting caught, being indicted, and suffering sanctions.

The variables *rent* and *risk* behave antithetically in terms of their incidence and consequent impact. Hence, increasing rent and decreasing risk leads to an increase in corruption. Inversely, an economy with lower rents and higher risks of getting caught is more likely to be less corrupt.

The dynamics of these factors are illustrated in figure 2.1. In the figure, we observe that the factors rent and risk impose different conditionality of corruption incidence on the economy, depending on their relative levels. Pervasive or high corruption (quadrant II) can be attributed to the simultaneous presence of high rents and a low risk of being sanctioned. Such circumstances can be seen in many developing countries where natural resources are abundant and institutions are weak. At the other extreme, the coupling of low rents with a high risk of getting caught results in low levels of corruption (quadrant IV). This is the case for most industrial countries where adequate corruption control measures are in place.

But what of the dynamics in the other two quadrants of the figure? The first situation occurs in countries that have low rents but do not have the systemic arrangements necessary to deal

---

2. We argue that rent and penalty are equivalent, with rent equal to penalty with a positive sign.

3. *Rent seeking* is a term coined, or at least popularized in political economy, by the economist Gordon Tullock. It is defined as the use of resources to bring about an unfair transfer of goods to oneself as a result of a favorable decision on some public policy.

Figure 2.1. *Dynamics of Rent and Risk on Corruption*
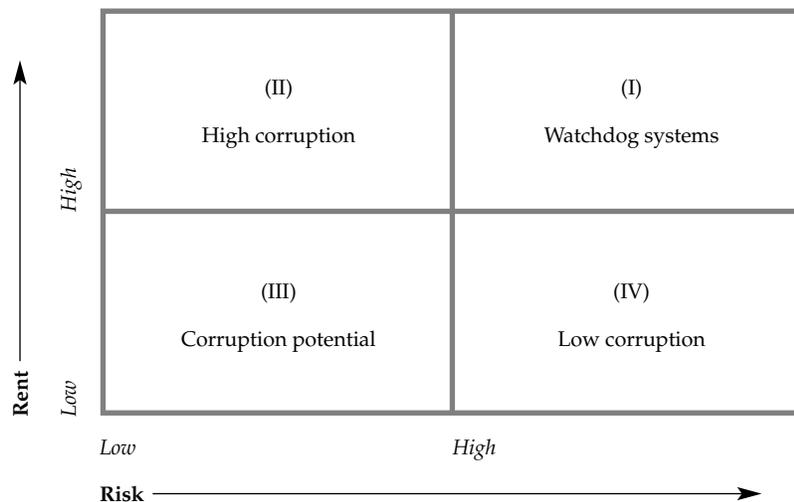
Source: Authors' illustration.

Figure 2.2. *Dynamics of Rent and Risk on Corruption—Ideal Scenario*
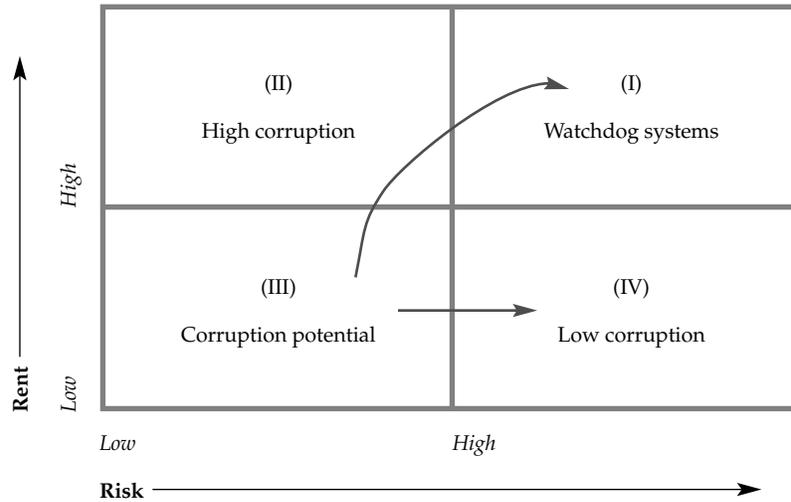
Source: Authors' illustration.

with corruption. A developing country that discovers natural resources illustrates this point. With the discovery of natural resources, the associated rents in the economy increase. In the first few years after resource discovery, the incidence of corruption is high because mechanisms to control it have not been instituted. When the country develops those mechanisms, it moves from the high-rent/low-risk quadrant (III) to the high-rent/high-risk quadrant (I). Figure 2.2 illustrates this developmental path by the arrow moving from quadrant III to quadrant I.

The best development scenario is for a country to avoid quadrant II altogether and to move directly to quadrants I and IV. That can be accomplished by attaining a good understanding of the causes of corruption and the mechanisms to fight it and by setting up adequate systemic and institutional arrangements.

Determinants of Corruption

We extend the Becker corruption function, corruption = f(rent, risk), to identify more specific determinants of corruption. Although it is difficult to make an exhaustive list of all the determinants, the literature on corruption identifies some of the more important variables. First, the level of rent is determined by the abundance of natural resources and the nature and structure of the economy. The level of rent is higher in economies that are rich in natural resources, less open to trade, less integrated with the international economy, and dominated by monopolies or oligopolies. Second, the level of risk is determined by a country's incidence of political transition, its value system, and the quality and performance of its institutions. We discuss each of these determinants below.

NATURAL RESOURCES. The abundance of natural resources is an important variable in determining an economy's level of rent. The high margin between the sale price and the extraction/production cost of natural resources, such as oil and minerals, generates rents that lead to aggressive rent seeking. This dynamic is known in the corruption literature as the "voracity effect." Lane and Tornell first documented this effect when they noted that an abundance of natural endowments leads to increased corruption (Sala-i-Martin and Subramanian 2003, citing Lane and Tornell 1996).

Additional empirical support was provided by Leite and Weidmann (1999), who noted that the extent of corruption depends on natural resource abundance, government policies, and the

concentration of bureaucratic power. Sala-i-Martin and Subramanian (2003) lent further support when they posited that natural resources have a seriously detrimental impact on the quality of domestic institutions and that the relationship is nonlinear (that is, endowments corrupt, and excess endowments corrupt more excessively).

We also note that Sala-i-Martin and Subramanian (2003) found that "while theoretical models would suggest that all natural resources have similar effects in terms of their instability and overvaluation effects, the impact of different natural resources on institutional quality could be very different. In particular, oil and minerals give rise to massive rent in a way that food or agricultural resources do not" (p. 9). Those authors refer to Isham et al. (2003), who labeled these resources as "point source" natural resources and who suggested that "what is detrimental to economic and political institutions is the lobbying for and allocation of the rents associated with such resources" (Sala-i-Martin and Subramanian 2003, p. 9).

NATURE AND STRUCTURE OF THE ECONOMY. In general, countries that are more open and better integrated with the outside economy have lower levels of rent because openness and integration force the country to adopt the same level of transparency as that practiced by its trade partners or investors. That hypothesis is supported by Krueger (1974), who noted that "evidence suggests that the value of rents associated with import licenses can be relatively large . . . [and] welfare cost of quantitative restrictions equals that of their tariff equivalents plus the value of the rents" (p. 301). Bhagwati (1982) wrote that trade restrictions generate a significant amount of rents and rent-seeking activities, and Leite and Weidmann (1999) argued that the "degree of openness is an important factor in determining the level of rent-seeking activities or the extent of corruption" (p. 7).

Based on microeconomic theory, we note that markets dominated by monopolies and oligopolies—which can be private or public (as in the case of state-owned enterprises)—tend to have higher levels of rent. Monopolies and oligopolies tend to increase rent to protect their business interests.

INCIDENCE OF POLITICAL TRANSITION. The Shleifer-Vishny (1993) framework postulates that a strong central authority with longer-term reign is more often associated with lower corruption than are decentralized regimes. A single monopoly bribe taker is more efficient in distribution of rents and is more likely to ensure that revenues are maximized. Thus, a shift from autocratic to democratic or from centralized to decentralized government results in more uncertainties, instability, and corruption. The transition and the formation of different sets of institutions create uncertainty and leave gaps in the system that lower the risk of getting caught.

The very fact that a country undergoes significant political transition implies that the probability of corruption increases. Transitions effected after a certain period of time has allowed the older regime to take root and influence governance and administrative systems increase this probability, especially if the transition is from an authoritarian to a democratic regime.

VALUE SYSTEMS. A society's value system significantly determines the risk of getting caught. Some societies—such as those that place a high premium on honesty, hard work, and integrity—have low tolerance for corrupt activities. Conversely, societies that value compassion and mercy over justice and fairness, and societies that have experienced corruption or have struggled with poverty for so long that the people are conditioned to view corruption as a norm or as an acceptable means to get out of poverty, tend to be more lax in enforcing rules against corruption.

We can surmise that societies that tend toward individualism over community relations and conformity would be less tolerant of corruption. Corrupt officials therefore have a higher risk of getting caught and being penalized in individualistic societies.

Value system as a determinant of corruption has been argued philosophically by economists and economic historians, such as David Landes (2000), who commented that "culture makes al-

most all the difference" (p. 20), and Amartya Sen (2005), who highlighted the relationship between culture in a society and the prevalence of economic corruption and organized crime. According to Landes, Max Weber first observed that certain cultures—particularly the Calvinist branches of Protestantism—defined, sanctioned, and encouraged a work ethic that valued honesty, seriousness, and the thrifty use of money and time. Protestantism produced a society of individuals who are rational, ordered, diligent, and productive, and who value hard work and honest trade (Landes 1999, pp. 174–77; Weber 1905).

Although there may be no empirical research that directly uses the term *value system* as a determinant of corruption, there is research that uses variables closely related to or subsets of a value system, including religion, colonial heritage, and the collectivist vs. individualist mindset. These variables, which are more measurable and therefore more empirically testable, may be considered close proxies for a value system. One example of those studies is the report by Serra (2004) who found that corruption is lower when the population is mainly Protestant and that corruption is significantly determined by a country's colonial heritage.

INSTITUTIONS. Institutions' quality and performance are important determinants of the level of corruption. Broadly speaking, the higher the quality and the better the performance of institutions, the lower the level of corruption.

A number of studies have supported that hypothesis. Serra (2004) noted that corruption is lower in countries where democratic institutions have been preserved for a long time and that it is higher where political instability is a major problem. Seldadyo and de Haan (2005), using extreme-bounds analysis, found that corruption is determined robustly by the quality of bureaucracy, government effectiveness, government official wage, the degree of decentralization, political freedom, the quality of the judiciary system, and the level of information available to the citizenry. Rauch and Evans (1999) found that the "extent of corruption is higher in countries in which civil service recruitment and promotion procedures rely less on merit-based considerations" (quoted in Leite and Weidmann 1999, p. 8). Shleifer and Vishny (1993) posited that the "structures of government institutions and of the political process are very important determinants of the level of corruption. Weak governments that do not control their agencies experience very high corruption levels" (p. 1).

To facilitate discussion of institutions, we adopt Global Integrity's six categories in analyzing the quality of institutions. We use this categorization because Global Integrity[4] specifically tracks governance, corruption, and accountability in institutions, and because the categorization itself is a comprehensive list of all causal factors of corruption. Here are the six categories:

1. *Civil society, public information, and media:* This category refers to the presence and dynamics of civil society organizations that can provide checks and balances to the excesses of government, access to information, and freedom of the press.
2. *Electoral and political processes:* This category refers to the holding of and credibility of national elections, the presence of election monitoring agencies, and the accounting for political party finances.
3. *Branches of government:* This category addresses the existence of effective checks and balances among the branches of government and the effectiveness and efficiency of the executive, legislative, and judicial branches.
4. *Administration and civil service:* This category refers to the efficiency and effectiveness of the bureaucracy; and it includes the government's budgeting, accounting, and auditing processes. It also covers whistle-blowing measures and the processes for procurement and privatization.

---

4. Global Integrity (http://www.globalintegrity.org/) is an international nonprofit organization established by the Center for Public Integrity, Washington, DC.

5. *Oversight and regulatory mechanisms:* This category pertains to four major activities—a national ombudsman, supreme audit institutions, taxes, and customs and financial sector regulation.

6. *Anticorruption mechanisms and the rule of law:* This category analyzes the effectiveness of anticorruption law implementation, the presence and capacity of an anticorruption agency, the rule of law, and access to justice (which includes enforcement of contracts and law enforcement).

Those six factors operate independently but often in combination with each other in affecting the level of corruption because they relate to a country's general institutional framework. Most of the factors have strongly interactive associations with each other, so it is important to analyze and separate them to identify the correct primary root.

Applying the Corruption Diagnostics Framework and Identifying the Primary Root

In figure 2.3 we present the Corruption Diagnostics chart that summarizes all of the determinants described above.

As stated before, corruption is a complex problem. Although the Corruption Diagnostics framework proposes a method, there is no specific technique for finding the primary root. There are symptoms, however, that can help identify whether a particular determinant is the primary root. For example, an abundance of natural resources might be the primary root if the country is highly dependent on natural resources, has not diversified into nontraditional products, and has frequent intrastate conflicts linked to the struggle for control of such resources. High de-

Figure 2.3. *Corruption Diagnostics Framework*
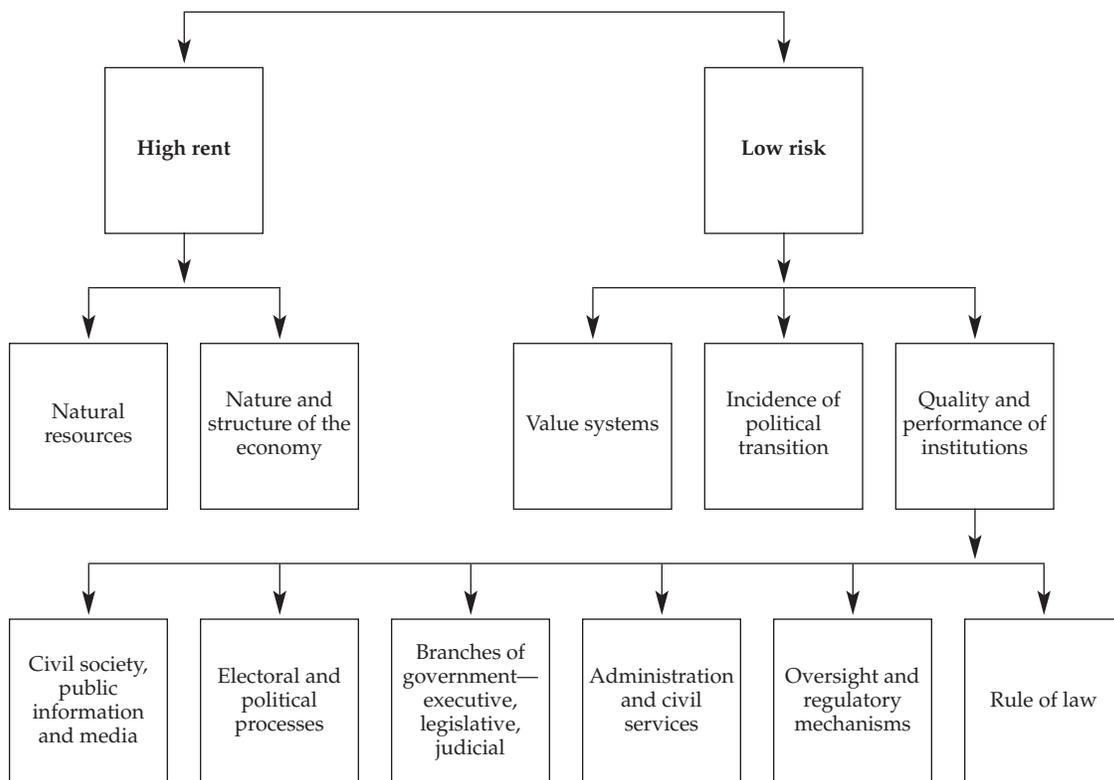
Source: Authors' illustration.

pendence is considered a plausible symptom, given the findings of Murphy, Shleifer, and Vishny (1993) that corruption tends to hurt innovative activities rather than everyday production. Corruption puts a severe tax on innovative activities, resulting in the allocation of resources into established production.

Frequent intrastate conflicts are a good indicator, given that the conflicts usually occur because the benefits of such resources are not perceived to be justly or equitably distributed but land instead in the hands of a privileged few through corruption and rent-seeking activities. The connection among natural resources, corruption, and conflict was summarized succinctly by Lujala, Gleditsch, and Gilmore (2005): "abundance of natural resources tends to be associated with low economic growth, rent-seeking, corruption, and the deterioration of institutions of governance . . . and these in turn increase the risk of conflict" (p. 4).

The nature and structure of the economy might be the primary root of corruption if there is evidence of a very high black-market premium, low entrepreneurial activity, low foreign direct investment, and markets that are dominated by inefficient state-owned enterprises (SOEs) or monopolies and oligopolies. (Such firms usually are owned or managed by individuals and politicians with excessive and sometimes unexplained wealth.)

The other variables—political transitions, the value system, and the quality and performance of institutions—are more directly observable. Cross-country perceptions indexes may be used to determine if these variables are the primary roots. However, that is not sufficient. Qualitative analysis of events and dynamics in the country is needed to arrive at the correct conclusions.

Diagnosing Corruption in Indonesia

Using our Corruption Diagnostics framework, we analyzed the case of Indonesia. Our analysis was from top to bottom as we went from general factors to particular aspects to understand the role played by each parameter.

Is Corruption Due to an Abundance of Natural Resources?

We found that, although Indonesia is abundant in natural resources, it does not exhibit the common symptoms associated with countries afflicted with the voracity effect. There are three arguments to support this finding. First, Indonesia is not highly dependent on natural resources. Using the ratio of net oil exports to GDP,[5] we found that Indonesia has the lowest net fuel exports-to-GDP ratio, compared with its oil-producing peers (figure 2.4).

Second, Indonesia successfully has diversified into other products. In an analysis of COMTRADE data for Indonesia, Austria et al. (2005) found that new export goods emerged over the period 1989–98. These exports include nontraditional products, such as computer inputs, telecommunications equipment, and electronic integrated circuits. This finding is further substantiated by an analysis of the sophistication of exports,[6] which reveals that, although Indonesia's exports are not highly sophisticated, the country does not lag behind other countries in

5. This ratio was based on Sachs and Warner (1995), who used the ratio of primary commodity exports to GDP to measure dependency on natural resources. However, there are criticisms against this indicator. First, primary commodities such as staple cereals do not have the same effect on corruption as do point resources such as oil and diamonds. Second, gross export is misleading because some countries, such as Singapore, have high gross exports sourced from imports. In our analysis, we corrected these flaws by computing *net* oil exports to GDP for *major oil-producing countries.* The data are still not perfect, however, because some oil-producing countries (such as Iraq, Libya, and Sudan) do not have reported COMTRADE data.

6. "Sophistication of exports" refers to a country's export basket and the level of technology and processing that characterizes the export items, and it represents the country's level of technological advancement.

Figure 2.4. *Ratio of Net Fuel Exports to GDP, Selected Countries, 1996–2003*
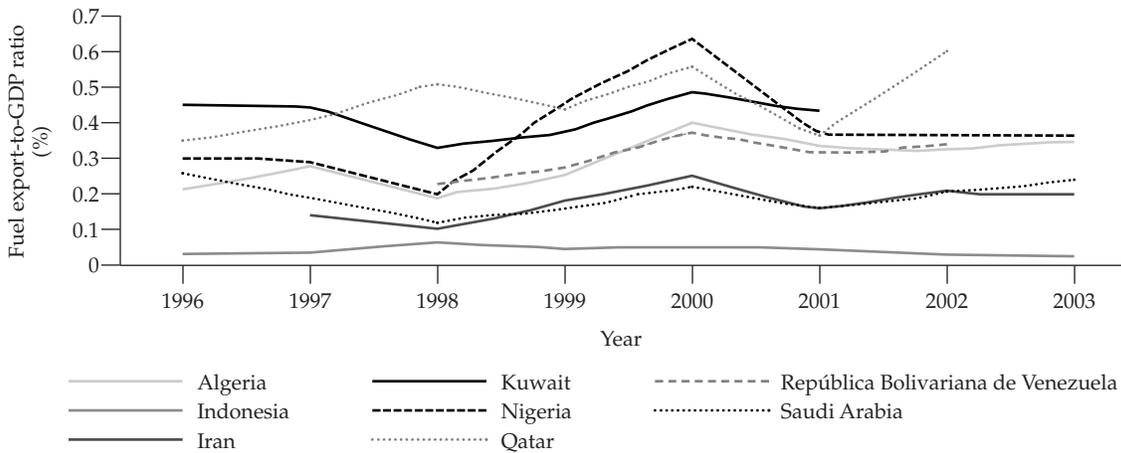
Source: United Nations Commodity Trade Statistics Database.
Note: GDP = gross domestic product.

Figure 2.5. *Sophistication of Indonesia's Exports, Relative to Selected Economies, 1992*
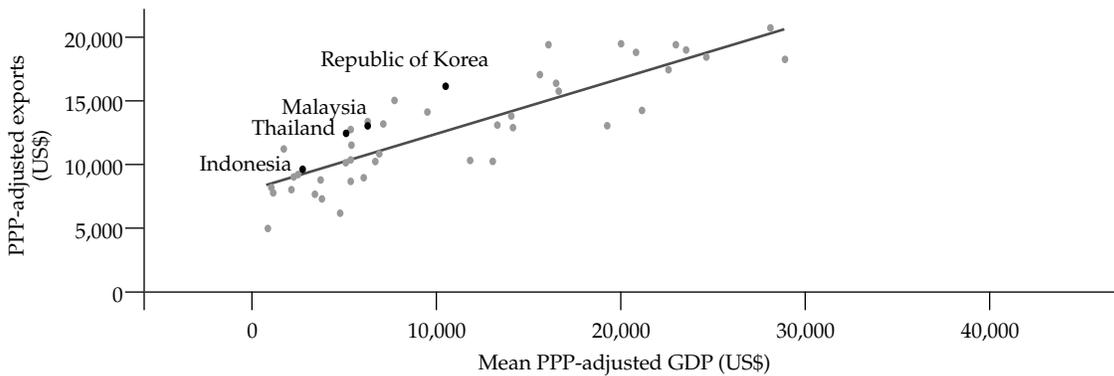
Source: Austria et al. 2005.
Note: GDP = gross domestic product; PPP = purchasing power parity.

terms of technological advancement (see figure 2.5). We can infer from this that Indonesia was not highly dependent on its resource endowments.

A review of Indonesia's economic history shows that the country's relatively low dependence on natural resources and on a diversification to nontraditional products was not accidental. Hofman, Rodrick-Jones, and Thee (2004) pointed out that Suharto's government actively pursued economic policies aimed at diversifying the economy and strengthening the agricultural and manufacturing sectors. Doing so prevented Indonesia from experiencing Dutch disease.

One last study that responds to the question posed in this section is a report by the World Bank (2004). It noted that conflicts in Indonesia tend to be related to ethnic tensions and not to natural resources. We consider this report to corroborate our conclusion that corruption in Indonesia is not caused primarily by the abundance of natural resources.

Is Corruption Due to Flaws in the Nature and Structure of the Economy?

Using the measure of outward orientation put forth by Sachs and Warner (1995),[7] we note that Indonesia is open to trade and well integrated with international financial markets. Specifically, it is a member of the World Trade Organization and, based on UNCTAD (2003) country reports, has not figured prominently in dispute cases as a violator of free trade rules. In addition, its normalized average black-market exchange rate premium is relatively low, compared with that of other countries, such as Pakistan and India (Caporale and Cerrato 2005). The finding that Indonesia is open to trade and well integrated with international markets is not unexpected. The country's economic history is replete with reform efforts aimed at liberalizing and integrating the economy with the rest of the world.[8] Therefore, we safely can exclude a lack of openness to trade and integration with international financial markets from our short list of possible primary roots.

The results, however, are slightly different regarding the presence of monopolies and oligopolies. Indonesia's economy does not operate completely on free market principles. Certain markets are dominated by private monopolies, oligopolies, and SOEs. This market structure easily can be traced through the country's economic history. In the 1970s, the government began to promote the creation of heavy industries in the steel, petrochemical, and automobile sectors using SOEs. It rationalized that state intervention was necessary because the indigenous population, the *bumiputera,* did not have the required experience and resources. Such an approach was not unique to Indonesia; most Asian countries implemented an interventionist government policy to promote industrialization. For many years, the Indonesian government, like other Asian countries, supported certain industries over others, worked closely with banks, and favored local firms (Perkins 2004). In the 1980s and 1990s, the Indonesian government sold some of its SOEs to private individuals and kept some others with the government. The U.S. Department of State (2005) has reported that, in May 2005, Indonesia's government still owned about 158 SOEs and controlled prices on several basic goods, including fuel, rice, and electricity. As expected, this industrial policy resulted in markets dominated by private and government-owned monopolies and oligopolies. The extent of such "control" is shown in tables 2.1 and 2.2.

Table 2.1 shows that approximately 20 percent of Indonesia's financial institutions and corporations are publicly held, with the remaining 80 percent owned by certain families or the state. This level of public ownership is significantly lower than what exists in such industrial countries as Japan and the United States.

The problem of such extensive private ownership is further exacerbated by allegations—and, in some cases, confirmed reports—that most of this wealth is concentrated in very few families, including the family of former-president Suharto (see Perkins 2004 and Stern 2003).

Table 2.2 shows that, in the period before 1997, certain sectors, which were deemed critical to Indonesia's national interest, were controlled by the government through government agencies and SOEs. The powers of these SOEs varied, but they generally provided monopoly power to the government because they managed market supply and demand, controlled prices, and handled all contracts.

When the Asian Crisis struck in 1997, this market structure became the focus of attention. Economists such as Bert Hofman, Paul Krugman, Dwight Perkins, and Joseph Stern commented that the structure made the country vulnerable to crisis (Hofman, Rodrick-Jones, and Thee

---

7. Sachs and Warner (1995) listed five criteria to consider in evaluating whether a country is outwardly orientated. Four of the five criteria are (1) maintained reasonably low tariffs and quotas, (2) did not have excessively high black-market exchange rate premiums, (3) was not socialist, and (4) avoided extreme state control of its export sector.

8. For an excellent account of liberalization reforms, refer to Hofman, Rodrick-Jones, and Thee (2004) and to Stern (2003).

2004; Krugman 1998, as discussed in Stern 2003; and Perkins 2004). Perkins went on to suggest that Indonesia should move toward a more market-based economy, with more vibrant participation from private economic actors and less intervention from the government. Indonesia responded to these criticisms and suggestions with reforms. The banking sector was restructured. Two significant changes that resulted from this restructuring were (1) the change of ownership

Table 2.1. *Control of Publicly Traded Companies in East Asia, 1996*

Economy	Number of corporations in sample	Share of corporations under ultimate control (%)	Distribution of ultimate control (%)			
			FOEs	SOEs	Widely held financial institutions	Widely held corporations
Indonesia	178	99.4	68.6	10.2	3.8	16.8
Asian peers						
Korea, Rep. of	345	85.7	67.9	5.1	3.5	9.2
Malaysia	238	99.0	57.5	18.2	12.1	11.2
Philippines	120	98.4	42.1	3.6	16.8	35.9
Thailand	167	97.9	56.5	7.5	12.8	21.1
Japan	1,240	58.0	13.1	1.1	38.5	5.3
Singapore	221	98.6	52.0	23.6	10.8	12.2
Hong Kong, China	330	99.4	64.7	3.7	7.1	23.9
Taiwan, China	141	97.1	65.6	3.0	10.4	18.1

Source: Perkins (2004), citing work by Claessens et al. (1999).
Note: FOE = family-owned enterprise; SOE = state-owned enterprise.

Table 2.2. *Sectors Controlled by Government Agency or SOE, Indonesia, Pre-1997*

Sector	Agency/SOE	Powers
Oil and gas	Pertamina	Pertamina was a vertically integrated, government-owned firm with monopoly powers over both upstream and downstream oil markets. In the upstream sector, it had the following powers: • Ownership of all national assets pertaining to oil and gas • Management of exploration and production contracts • Approval of exploration licenses • Negotiation of contracts (for example, production sharing agreements). Pertamina had a full monopoly on the downstream oil sector, including both refining and retailing. It controlled the price of petroleum products.
Rice and other agricultural commodities	BULOG (Badan Urusan Logistik; Bureau of Logistics)	BULOG was set up to oversee rice policy and stabilize rice prices. It accomplished this by directly purchasing milled and unmilled rice and by being the sole importer of rice. It injected stored or imported rice into domestic markets when shortages caused excessive price increases. Other commodities, such as sugar and wheat, eventually were put under its control (Dillon 1999; Hofman, Rodrick-Jones, and Thee 2004).
Electricity	PLN (Perusahaan Listrik Negara)	PLN was a vertically integrated, stated-owned utility firm handling all four aspects of the electricity utility—generation, transmission, distribution, and supply.

Sources: Information from BULOG (http://www.bulog.co.id/), Pertamina (http://www.pertamina.com/), and PLN (http://www.pln.co.id/); Austria 2005.
Note: SOE = state-owned enterprise.

at banks affiliated with business groups and (2) the entry of foreign-owned private banks. Sato (2005) reported that only seven of the 42 banks affiliated with business groups survived without ownership changes. In particular, the former Indonesian owners of some of the biggest banks were replaced by new owners, most of them foreign banks.

The oil and gas sector was not spared either. Pertamina was divided into two agencies and its powers were reduced significantly. Responsibility for the upstream sector was transferred to Badan Pengatun and the downstream sector was moved to BPH Migas. Pertamina's regulatory functions were transferred to a directorate-general of oil and gas, which is part of the Ministry of Energy and Mineral Resources.

Efforts to reform rice and electricity agencies were not as successful. BULOG's functions, structure, and authority remained constant until January 2003, when its status was changed from a national agency to a business enterprise in the form of a "general company." In 2004, the Electricity Law, aimed at corporatizing and privatizing PLN, was declared unconstitutional, so PLN was able to maintain its pre-1997 function and structure.

To date, monopolies and oligopolies persist in Indonesia, although on a much smaller scale than before the Asian Crisis. Therefore, is the existence of these entities the primary root of corruption? We believe it may be *a* root of corruption but probably is not the primary one. Our rationale is as follows: if this variable were the primary root, the reforms between 1997 and the present substantially would have reduced the level of corruption by now—but we find such reduction has not occurred.

Is Corruption a Result of Political Transitions?

The three main indicators of a political transition affecting corruption in a country are (1) investor pullout, (2) sudden surges in corruption levels, and (3) hesitation on the part of new investors. All of these factors are present in Indonesia.

The country underwent a major political shift in 1999 when the first democratic elections in more than three decades were held. Abdurrahman Wahid ended Suharto's 34-year rule. This transition from a central authority to a democratic one corresponded with a decrease in investor confidence in Indonesia (which supports the Shleifer-Vishny [1993] theory that uncertainties associated with decentralized authority decrease the efficiency of rents distribution and increase gaps in the system).

To analyze the effect of decentralization of authority on corruption, we considered investment and investor confidence in Indonesia. As shown in figure 2.6, Transparency International's Corruption Perceptions Index for Indonesia dropped significantly in 1998 and went even lower in 1999 and 2000.

Figure 2.6. *Corruption Perceptions Indexes for Indonesia, 1995–2005*
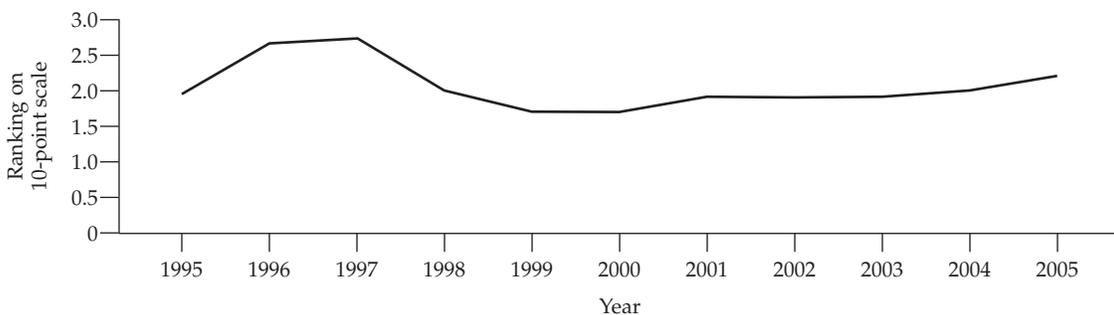
Source: Transparency International Corruption Perceptions Index, various years (http://www.transparency.org/policy_research/surveys_indices/cpi).

Actual foreign direct investment is revealed in figure 2.7, which shows a significant and sustained drop beginning in 1997 in spite of decentralization. Although this drop could be attributed to the 1997 Asian Crisis, which affected Indonesia significantly, table 2.3 reveals that the lowering trend was reversed in 2000 and then investment dropped again at the time of the "Big Bang" decentralization initiated in 2001.

The problem of low levels of foreign investment is compounded by the fact that most investors reported an increase in constraints faced after decentralization (ADB 2005). According to the ADB study, firms operating in Indonesia reported that problems related to economic policy, corruption, and regulations worsened. The study revealed that taxation was the main issue faced by firms, and more than 11 percent of the firms reported that interactions with the tax inspectorate resulted in informal payments.

Table 2.4 shows the results of the 2003 investment climate and productivity study that reflect business perceptions since the decentralization that began in January 2001. According to the study, one-third of the firms surveyed reported that informal payments increased since January 2001, although the effectiveness of these payments did not improve.

The arguments presented here indicate that the political transition to a democratic structure of governance was associated with a decrease in efficiency in the business sector and is a reflection on other sectors as well. Changes in political systems not accompanied by suitable governance support mechanisms led to further escalation of problems related to corruption. Moreover, informal taxation and rent seeking emerged as ways of coping with inefficiencies and lack of accountability.

From these findings, we note that, although it is not the primary root, the factor of political transition is responsible to a large extent for the existence of corruption.

Figure 2.7. *Foreign Direct Investment Flow within Indonesia, 1990–2002*
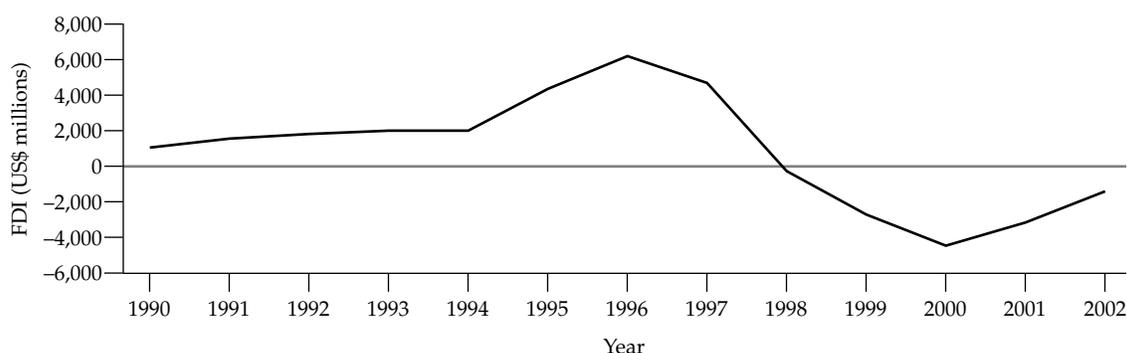
Source: International Monetary Fund 2004 Foreign Direct Investment Statistics.
Note: FDI = foreign direct investment.

Table 2.3. *Total Foreign Investment Approval, 1997–2002*

Year	Total amount approved (US$ millions)	Year	Total amount approved (US$ millions)	Year	Total amount approved (US$ millions)
1997	33,833	1999	10,891	2001	9,027
1998	13,565	2000	15,431	2002	9,793

Source: 2003 Indonesia Investment Climate Statement.

Table 2.4. *Findings of the Investment Climate Survey of Business Perceptions*

Factor	Improved / somewhat improved		Stayed the same		Deteriorated / somewhat deteriorated	
	Number	*%*	*Number*	*%*	*Number*	*%*
National and local labor regulations	155	21.7	379	53.2	179	25.1
National and local business licensing and operating permits	150	21.0	411	57.6	152	21.3
Economic and regulatory policy uncertainty	85	11.9	345	48.4	283	39.7
National and local corruption	81	11.4	336	47.1	296	41.5

Source: ADB 2005.

Is Corruption a Derivative of the Value Systems?

The sociocultural value systems that define Indonesian society and contribute to or disallow corruption are discussed in this section. We focused on three areas—colonial heritage, religion, and the collectivist mindset.

The colonial heritage in Indonesia is important in understanding the present systems. The Dutch East India Company that established Indonesia as a Netherlands colony was primarily an extractive entity, with its central focus on natural resources. This type of colonization did not lend itself to the development of suitable institutions for governance and hence led to increased corruption and malpractice (Acemoglu, Johnson, and Robinson 2001). The lack of institution building is reflected in institutions related to the rule of law, justice systems, and civil services that are weak and ineffective.

Indonesian society is hierarchical, and there are definite levels and obligations of individuals in the social structure. Based on the importance given to traditional and family values, Indonesia does not fall within Inglehart's (1997) post-modernization category. Rather, Indonesians place more value on family and community cooperation. This value system could explain both the high prevalence of and the tolerance for nepotism and crony capitalism that existed during the Suharto era (Hofman, Rodrick-Jones, and Thee 2004).

According to Dean's (2001) classification of Indonesian society (table 2.5), although 95 percent of the population is Muslim, there are differences in the way religion is viewed and prac-

Table 2.5. *Dean's Classification of the Segments of Indonesian Society*

Affiliation	Traditionalist	Modernist
Nationalist	*Abangan:* Population associated with the indigenous animist mysticism of Java; 37 percent of votes cast in 1999 elections	*Priyayi:* Population associated with the Hindu-Buddhist mysticism of the Javanese Court; 15 percent of votes cast in 1999 elections
Religious	*Syncretic Muslimin:* Population associated with a syncretic mix of Islam and the indigenous mysticism; 27 percent of votes cast in 1999 elections	*Textual Muslimin:* Population associated with a textual, or literal, view of Islam and the aesthetics of Arabia; 12 percent of votes cast in 1999 elections

Source: Dean 2001.

Table 2.6. World Bank/Kaufmann Indicators for Indonesia, Selected Years

Indicator	1996	1998	2000	2002	2004
Voice and accountability	−1.15	−1.33	−0.52	−0.49	−0.44
Political stability	−0.45	−1.47	−1.85	−1.45	−1.38
Government effectiveness	0.18	−0.52	−0.40	−0.55	−0.36
Regulatory quality	0.27	0.10	−0.34	−0.67	−0.42
Rule of law	−0.36	−0.97	−0.93	−0.89	−0.91
Control of corruption	−0.47	−0.95	−1.00	−1.15	−0.90

Source: Worldwide Governance Indicators 1996–2004.

ticed by segments of the population, and these demarcations were reflected during the 1999 elections.

These religious affiliations go against Serra's (2004) and Weber's (1905) theses about Protestant ethics decreasing corruption. However, the mix also reflects Sen's (2005) view that religion may not be the determining agent in growth.

Moreover, Indonesia has a fairly well-established civil society sector that helps maintain checks and balances and keeps a watch on corruption.

Is Corruption Due to the Quality and Performance of Institutions?

Indonesian institutions do not fare well when measured in terms of the 2003 World Bank/Kaufmann indicators of corruption.[9] Table 2.6 gives the country's scores for five years during the period 1996–2004.

We now analyze various groups of institutions to discern the presence and extent of corruption within them.

CIVIL SOCIETY, PUBLIC INFORMATION, AND MEDIA. Civil society movements and nongovernmental organizations (NGOs) emerged in Indonesia in the late 1970s and early 1980s. Although these organizations emerged independent of political affiliations, the government imposed laws that required NGOs to declare the orientation of their issues and their financial, organizational, and policy dimensions. Since the mid-1990s, NGOs and civil society have worked with students and the literate masses to produce changes in the governance structure, especially during the transition to democracy. The number of NGOs increased to more than 6,000 in the 1990s (Molyneux 2000). The legal constraints on NGOs are not restrictive, and there are minimal registration and foreign aid–reporting requirements (Swadaya 1994).

Currently, NGOs are associated with a large number of developmental programs, including education, health, and the environment, across the country. About 290 NGOs are associated with the literacy movement in 10 provinces[10] and a similar number are providing support to the government's health care programs.

Indonesia does well in the area of public information and communication and in freedom of the press and the media. According to the Center for Public Integrity's Global Integrity country report for Indonesia (CPI 2004), the media is one of the brightest features of the present Indonesian governance environment. The private press aggressively reports on government policies, corruption, and other controversial subjects (Freedom House 2005). The government lifted almost all restrictions on the media in May 1998 after Suharto resigned, and the passage of a lib-

---

9. The annex presents Indonesia's integrity scorecard compiled by the independent, nonprofit organization Global Integrity.

10. See the Asia Pacific Literacy Database, http://www.accu.or.jp/litdbase/policy/idn/index.htm.

eral media law in October 1999 greatly enhanced the freedom of the press. That law eliminated all licensing requirements and removed the government's ability to ban publications.

Public information is managed through the Ministry of Information (which was closed during the Suharto era), a ministry that is part of the government's development initiatives. This ministry also is responsible for drafting laws ensuring freedom in broadcasting that are modeled on the work of the U.S. Federal Communications Commission (CPJ 1999).

Given all of that information, we conclude that the media helps rather than retards efforts to curb corruption and that the institution is a healthy, proactive agent in the country.

ELECTORAL AND POLITICAL PROCESSES. Indonesia had its first democratically held elections in 1999. There was a very high voter turnout (93.3 percent), with 49 parties competing for office. The successive election in 2004[11] also had a large voter turnout (84.5 percent), with 24 competing parties.[12] There were no attempts to subvert the holding of elections in either year, although many agencies (including Global Integrity) reported that there were many electoral irregularities. According to a report by the Carter Center (2005), which monitored the 2004 elections, the voting was conducted peacefully, although there were some irregularities related to planning, election law, and corruption. The anecdotal evidence collected by the Carter Center, however, points out that the cases of corruption were initiated by individuals rather than by political parties.

The Legislative Election Law also required the creation of a national election supervisory committee (*Panwaslu*), which was appointed to oversee the election process. This committee included members from the police, the attorney general's office, educational institutions, the media, and civil society. According to the Carter Center (2005) report, the *Panwaslu* and the Constitutional Court provided important oversight of the election process.

Global Integrity has highlighted a significant drawback in terms of maintaining accountability: elected officials are not answerable to geographic constituencies and are appointed instead by the parties (CPI 2004).

On the whole, however, the electoral and political processes in Indonesia are relatively free and fair. There are some irregularities, but those are not sufficiently severe to be considered a primary root of corruption.

ADMINISTRATION AND CIVIL SERVICES. The Indonesian civil service system emerged during the 1920s when decentralization through the Reform Law of 1922 diversified the administrative structure of the municipalities controlled by the Dutch East Indies government and led to the appointment and integration of that structure as the Indonesian civil service.

In terms of its structure and functionality, however, the civil service framework was less efficient than those entities set up by the British in peer countries. The structure did not improve, and probably deteriorated, under the successive rules of Sukarno and Suharto, which spanned more than six decades. As a result, the civil service agencies in Indonesia were ill equipped to handle and control corruption and support efficient governance. The absence of a strong and effective civil service also compounded problems faced during political transitions because the governance system was not able to deal with decentralized authority, and that led to an increase in disorder and corruption.

The Global Integrity report points out a number of structural flaws in the Indonesian civil services that have led to uncontrolled corruption—flaws including the opportunity for people to "buy" lucrative positions and contractual appointments, the allocation of benefits according to the discretion of supervisors, and the falsification of revenue and development budgets (CPI 2004).

---

11. Press release issued May 2004 by The Netherlands Institute for Multiparty Democracy.

12. "Report on Indonesian Elections" by SEAsite, Center for Southeast Asian Studies, Northern Illinois University, DeKalb. http://www.seasite.niu.edu/Indonesian/Indonesian_Elections/elect_set.htm.

Some of the main problems with the civil service are the absence of a merit-based promotion system, low pay for civil service employees, and few incentives to promote efficiency and effectiveness and reduce corruption. The World Bank (2003) has reported the presence of informal patronage behavior, with top management making discretionary allowances for subordinates in exchange for loyalty. This patronage behavior results in an absence of whistle-blowing agencies and vigilance committees that otherwise would help keep corruption in check. Global Integrity has reported political interference and the cultivation of a conflict of interest in financial matters to extract illegal levies and bribes (CPI 2004). Hofman, Rodrick-Jones, and Thee (2004) noted that the Indonesian civil service suffers primarily from a skills deficit, centralized decision making, and complex and opaque salary systems.

A number of civil service reform measures were initiated in 1999 to deal with existing problems. That year, Indonesia enacted a Basic Law on Civil Service Reform that established the basis of reform for the country. According to the report titled "Governance Reform in Indonesia" (Witoelar 2001), 22 articles of that law form the basis for developing professional and nonpartisan civil servants and a decentralized structure for the civil services, and they facilitate establishing an independent Civil Services Commission to formulate civil service policies and an effective National Civil Service Agency responsible for civil service management.

The civil service system in Indonesia is far from efficient and effective, and there are many shortfalls and gaps in its structure and functioning that have caused problems of corruption to escalate.

OVERSIGHT AND REGULATORY MECHANISMS. Although Indonesia has a long way to go to rid itself of burdensome regulatory requirements that delay and restrict businesses, there are regulatory institutions to monitor financial and tax systems and take care of audits and peer reviews. Global Integrity indicates that the following offices in Indonesia perform well: national ombudsman, audit institutions, and financial sector regulation (CPI 2004).

The Central Bank of Indonesia was given independent status through the Central Bank Act of May 1999. This independence guaranteed the Central Bank's freedom from government interference.

RULE OF LAW. Agency assessments and surveys that record citizens' trust in government institutions have recorded the status of the rule of law in Indonesia as unsatisfactory. According to Global Integrity's country report for Indonesia, the level of security felt by citizens decreases as one moves away from city centers. The police reportedly are more likely to interpret justice arbitrarily (CPI 2004). By the World Bank/Kaufmann indicators, Indonesia had an average score of –0.93 over the four measured years 1998, 2000, 2002, and 2004. The situation of the rule of law worsened considerably after the political transitions of 1998, and the Kaufmann indicator dropped from –0.36 in 1996 to –0.97 in 1998.

According to Transparency International's Global Corruption Barometer (TI 2005), the police system is viewed as the second-most corrupt system (after political parties) and has a score of 4 on a 10-point scale. The police system in Indonesia was placed under the president's direct oversight starting in 2001—a move intended to demilitarize the police force. According to a description of the Indonesian police system given at an open forum of the United States–Indonesia Society, the police force is a 285,000-strong organization considered inadequate to manage the country's population (Masters 2002). The system is still a centralized and nationalized institution, and the recruitment process is informal and arbitrary. According to Adrianus Meliala of the University of Indonesia, the main challenges to reform of the police system are politicization of posts, government inconsistency, inadequate budgets, conflicts with the military, and absence of strong leadership.

According to Global Integrity and other agencies, the operations of the police system are hampered by the absence of a corresponding law-enforcing judiciary. Global Integrity also has reported that the rule of law in Indonesia is weak and ineffective in controlling corruption (CPI 2004).

Given these findings, we believe the rule of law is a significant contributor to the flourishing of corruption. In terms of defining and addressing the primary root of corruption, however, exclusively targeting the police system will be ineffective because it won't be possible to bring law to its just ends without corresponding judicial interventions. Although the rule of law is a major constraint to reducing corruption in Indonesia, it is not the primary root.

Government Bodies—Executive, Legislative, and Judicial. Since the democratization of the country, Indonesia has enacted constitutional reforms to alter and strengthen its executive and legislative bodies. The president is directly elected by the people and is supported by the vice president and the cabinet of ministers. The national legislature (the People's Consultative Assembly) was reorganized to comprise the People's Representative Council and the Regional Representative Council reconstituted with representative seats for the military, and a new Regional Representative Assembly was created. A transition toward complete demilitarization of the assembly was made in 2004—a shift from the time when the assembly enjoyed most power (during the Suharto era this body had a monopoly on authority). These changes reflect a distribution of power that differs from that of the Suharto era and reveal the nation's attempts to decentralize power and reduce corruption.

In spite of many sweeping reforms, however, the executive branch is still considered very corrupt, as is reflected both by public opinion and by the court cases filed against members of the executive branch but summarily dropped or withdrawn.

Transparency International's Global Corruption Barometer indicates that Indonesians consider the members of the executive branch of government among the most corrupt agents, ranking them on a par with a corrupt rule of law system (TI 2005). Jurist, a Web-based legal news and research service of the University of Pittsburgh School of Law, has reported that Indonesia's judiciary is subordinate to the executive branch and does not carry through the cases filed in courts.

Global Integrity has stated that the executive branch is known to be very corrupt and that it follows a system of patronage networks in which higher officials can authorize benefits to their employees in return for confidentiality in corrupt practices. Global Integrity has cited two reasons for corruption in the executive branch: (1) insufficient budgeting for government departments that necessitates off-budget incomes and expenditures to pay operational costs, and (2) imprecise budgeting for programs that makes large elements discretionary and thus fosters patronage networks (CPI 2004). The lack of accountability and of effective justice systems also is responsible for maintaining high levels of corruption in the various branches of government.

The justice and legal system in Indonesia is based on Roman-Dutch law, although it has been modified with indigenous concepts. The system, however, is highly ineffective and corrupt, and it is unable to carry out its role of maintaining and meting out justice (see box 2.1). The judicial branch was placed under the Supreme Court in 2004, but has not been able to gain public confidence because of its weak capacity, inadequate training, and interference by the executive

---

Box 2.1. *Court Costs?*

In 1987, in a Jakarta courtroom, an angry woman hurled her shoe at the judge. The woman, a disappointed plaintiff named Mimi, was annoyed at the toga-clad figure everyone called *Bapak Hakim* (Mr. Judge).

Mimi paid a price for that episode: she was jailed for six months for "contempt of court." She later alleged that she'd bribed the judge Rp 2.5 million ($300) to mete out punishment to the woman Mimi was suing. According to Mimi, the judge reneged on the deal, probably because the defendant had paid him a larger bribe.

Source: CPI 2004.

branch (HRF 2005). The NGO Indonesia Corruption Watch has noted the existence of deep-rooted corruption extending to all areas of the judiciary.

A United Nations Development Programme report pointed out the lack of and need for judicial independence in Indonesia (Dung 2003). Human Rights First also highlighted the observations of United Nations special reporter Param Cumaraswamy, who commented strongly on the presence of corrupt practices in the Indonesian judiciary (HRF 2005). Hofman, Rodrick-Jones, and Thee (2004) stated that the Indonesian judiciary has become ineffective after being marginalized historically.

According to the 2005 ADB report on improving the investment climate in Indonesia, the most severe constraint to increased investment there is the high level of overall uncertainty, especially regarding justice, the enforcement of property rights, and the upholding of the law. Figure 2.8 shows the degree of uncertainty regarding Indonesia's legal environment, with 45 percent of the firms surveyed in the 2003 Investment Climate and Productivity Study not believing that the Indonesian court systems are fair or impartial.

The present judicial system was carried over from the Suharto era to the present without many reform measures being implemented. Although attempts have been made to reform it—especially after 1998—it still requires significant changes and reforms that target corruption. Some of the main reasons leading to corruption in the judicial branch are the existence of a patronage system, the absence of a merit-based promotion system, low pay for employees, a lack of incentives to charge and prosecute offenders, and a lack of vigilance and peer review that permits extremely corrupt judges to go unpunished.

Because the judicial system is responsible for maintaining checks and balances in other sectors and is itself highly corrupt and in need of extensive and systematic reform, it is similar to other sectors in Indonesia that are corrupt and have weak institutional underpinnings. Its ineffectiveness contributes significantly to increases in corruption in other sectors, notably the executive branch and the police system. It undermines the rule of law and contributes to uncertainty in the business environment.

Targeting the judicial system for reform at this point is likely to garner political will and support because reforming the judiciary is considered less threatening to policy makers.

Given the findings reported here, we conclude that a corrupt, weak, and ineffective judiciary with a history of suppression and a lack of empowerment is the primary root of corruption in Indonesia. Its problems are exacerbated by political transitions and a corrupt and inefficient civil service. Our assertions are validated by Transparency International's Global Corruption Report (2007), which stated that judicial corruption fuels impunity and corrodes the rule of law.

Figure 2.8. *Uncertainty about Indonesia's Legal Environment among Surveyed Firms, 2003*
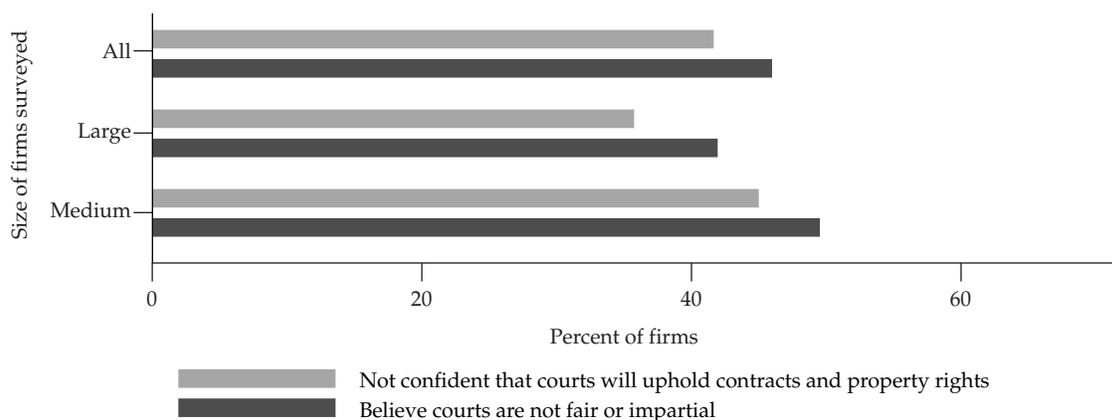
Source: ADB 2005.

Figure 2.9. *Corruption Diagnostics Framework for Indonesia*

Legend: **Not a problem area**   *Cause for concern*   ***Primary root / contributes to primary root***
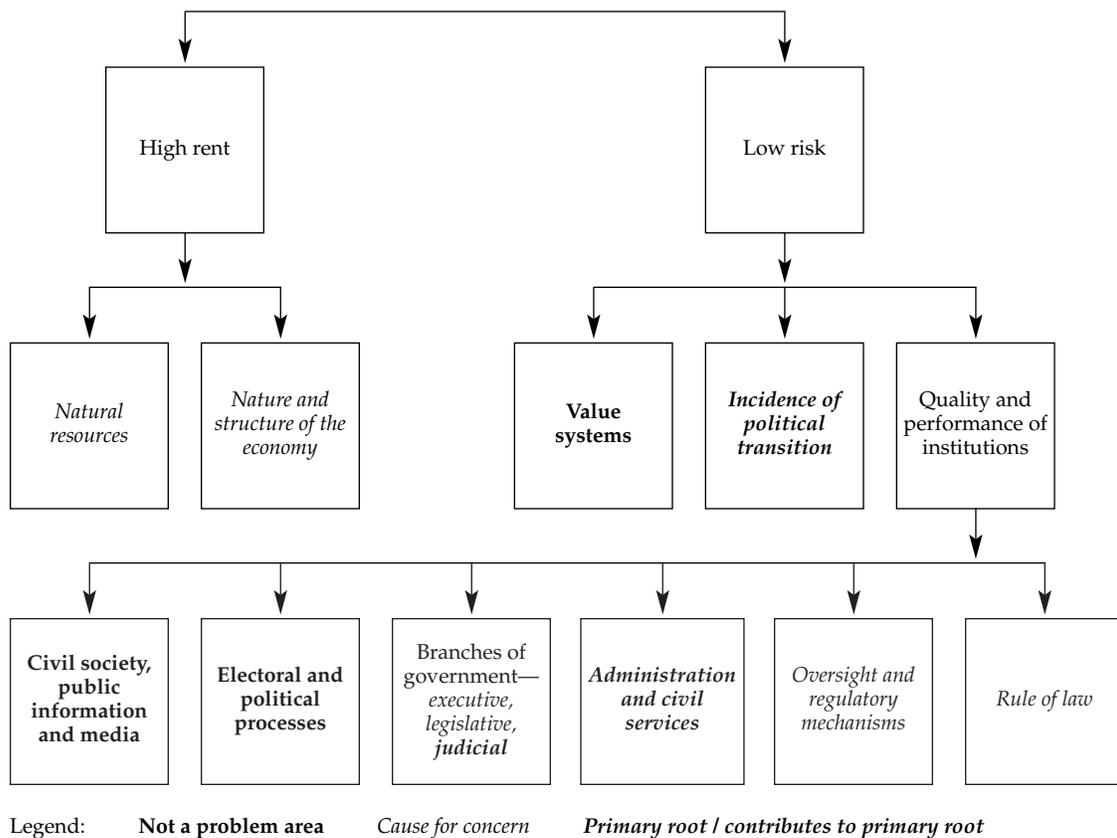
Source: Authors' illustration.

The Heritage Foundation's (2007) assessment is similar, noting that judicial enforcement is erratic and nontransparent and that fair arbitration is not guaranteed.

Policy Analysis and Recommendations

In the previous section, we diagnosed Indonesia's corruption, using our Corruption Diagnostics framework. The overall results of this diagnosis are illustrated in figure 2.9. As stated above, the results indicate that a corrupt, weak, and inefficient judiciary with a history of suppression and lack of empowerment is the primary root of corruption in Indonesia.

In this section, we analyze the policy options and possible reform measures available to deal with corruption. To avoid potential problems, we also look at other countries' experiences in dealing with corruption. Finally, we offer some policy recommendations, including specific action steps.

Corruption is a complex problem, and strategies for fighting it must include institutional, societal, and economic reforms. According to the Office of Democracy and Governance of the U.S. Agency for International Development (1999), a reform agenda intended to address corruption should include the following efforts:

1. Reducing the role of government in economic activities to limit authority
2. Strengthening transparency, oversight, and sanctions to improve accountability
3. Redesigning terms of employment in public services to improve incentives.

PricewaterhouseCoopers (Whitehead 2003) stated that, traditionally, there are four focus areas for anticorruption drives—(1) societal initiatives to establish a common standard of morality, (2) legal initiatives that rely on the effectiveness of appropriate laws and the legal process, (3) market initiatives relying on the assumption of market power and "less government," and (4) political initiatives seeking to decentralize and increase salaries to decrease incentives for corruption. Many countries have adopted these policies in designing their reform agendas.

Given these factors, the reform agenda for Indonesia should have the following characteristics:

1. It must have strong political support, and its supporters must have the political will to implement specific action plans.
2. It must simultaneously address current problems and long-run concerns by building the necessary institutions.
3. It must be pragmatic, workable, and inclusive of public opinion and market support. Note that the last point on fostering inclusiveness can be achieved by meeting the needs of the public and by avoiding waste, inefficiency, and the duplication of effort.

Our policy recommendations for judicial reform in Indonesia must include measures that will address immediate reform issues and the long-term objective of significantly reducing corruption. To deal with the immediate concerns, it is important to note that the problems of corruption pervade most of the present judicial appointments in Indonesia. Therefore, a system to make the present structure more resistant to corrupt practices should be developed. Some strategies that can be used to develop such a system are these:

1. Setting up "corruption courts" to provide a more effective and accessible justice system. These courts will deal primarily with cases of corruption. The appointment of judges for these courts will be the responsibility of the Ministry of Justice or the Supreme Court.
2. Introducing merit-based promotion with a clause requiring that appointees secure a "clean bill of health" from the corruption courts. This reform is a major deviation from the current time-based and seniority-based system of promotions, which are prone to favoritism, nepotism, and further corruption.
3. Establishing a prosecution branch within the Ministry of Justice to ensure that legal actions are taken against corrupt government employees. We note that corruption is high because employees deem the prosecution risk to be low.
4. Requiring that judges both prosecute *and* judge a case following the judiciary model in The Netherlands whereby judges are actively engaged in ensuring justice. This model increases the pressure on judges to be involved in the cases, and may be an effective strategy for reducing bribery.
5. Requiring judges to disclose personal information, such as their assets and liabilities, and subjecting them to close monitoring. Public and media scrutiny and mandatory reporting of personal wealth usually deter arbitrary and corrupt practices.

Long-term reform strategies to be implemented during the next 15–20 years should be aimed toward securing a clean judiciary. These reforms should include planning slow salary increases for judges and reframing the system and duration of judicial appointments. To minimize corruption and ensure the active involvement of judges in reducing corruption, long-term (15-year minimum) judicial appointments are essential.[13] A similar set of reforms is recommended for the civil services as a next step in reducing corruption.

Involving the government, the private sector, the nongovernmental sector, and the public is essential when implementing these reforms. The role of the private sector is crucial because the public's need for security and stability is of prime importance. The tasks of civil society and the

---

13. The authors reached this conclusion following a discussion with Frederick Schauer of the John F. Kennedy School of Government, Harvard University, Cambridge, MA, February 2006.

media are to generate positive publicity for these reform measures and to make information and options widely known to the populace. Public participation is important in creating broad-based corruption-monitoring systems and in increasing societal pressure for effective reforms.

Conclusion

In this chapter, we presented a diagnostic framework for analyzing corruption. The framework involves the analysis of corruption determinants based on the associated factors of rent and risk.

Our examination of the literature revealed that the presence of high rents is associated with the presence of natural resources and with the nature and structure of the economy and its markets. The absence of risk (that is, the risk of getting caught) in corruption was found to be a result of the country's value systems, a history of political transitions, and the quality and performance of its institutions. Analyzing corruption within this diagnostic framework established a way to identify the "primary root" of corruption so that policy makers can set a successful strategy to reduce corruption.

We used our framework to diagnose corruption in Indonesia, and found the major causes of corruption there to be the judiciary, the civil services, and a recent history of political transitions.

Of those causes, the judiciary was identified as the primary root of corruption in Indonesia. Corruption in the judiciary has a direct and significant impact on such other factors as the rule of law, the executive branch, political parties, and economic stability.

We suggested several reform efforts to address that primary root within the existing system and over the long term. To deal with the existing system, we recommended setting up special corruption courts to handle cases of corruption, introducing merit-based promotions, creating a prosecution branch within the Ministry of Justice, requiring judges to prosecute *and* adjudicate cases, and introducing monitoring and measures to ensure transparency and public scrutiny within the judicial system.

Finally, we believe that the Corruption Diagnostics framework used in this report can be applied to other countries to detect the primary roots of corruption and then facilitate the design of effective reform measures.

Annex: Global Integrity Scorecard for Indonesia

Overall, Indonesia ranks 19th among 25 countries on Global Integrity's Public Integrity Index. Such a ranking puts it into the weak tier of countries. Indonesia scores in the strong tier (80–90) for Category V, in the moderate tier (70–80) for Categories I and II, in the weak tier (60–70) for Category III, and in the very weak tier (below 60) for Categories IV and VI.

Table 2A.1. Global Integrity Scorecard, Indonesia

Category	Description	Score	Rank
Category I	Civil society, public information, and media	71	Moderate
I-1	Civil society organizations	88	Strong
I-2	Access to information law	42	Very weak
I-3	Freedom of the media	82	Strong
Category II	Electoral and political processes	73	Moderate
II-1	National elections	90	Very strong
II-2	Election monitoring agency	90	Very strong
II-3	Political party finances	39	Very weak
Category III	Branches of government	63	Weak
III-1	Executive	63	Weak
III-2	Legislature	69	Weak
III-3	Judicial	58	Very weak
Category IV	Administration and civil service	49	Very weak
IV-1	Civil service regulations	47	Very weak
IV-2	Whistle-blowing measures	19	Very weak
IV-3	Procurement	79	Moderate
IV-4	Privatization	50	Very weak
Category V	Oversight and regulatory mechanisms	85	Strong
V-1	National ombudsman	91	Very strong
V-2	Supreme audit institution	95	Very strong
V-3	Taxes and customs	65	Weak
V-4	Financial sector regulation	89	Strong
Category VI	Anticorruption mechanisms and rule of law	55	Very weak
VI-1	Anticorruption law	51	Very weak
VI-2	Anticorruption agency	66	Weak
VI-3	Rule of law and access to justice	61	Weak
VI-4	Law enforcement	44	Very weak

References

Acemoglu, D., S. Johnson, and J. Robinson. 2001. "The Colonial Origins of Comparative Development: An Empirical Investigation." *American Economic Review* 91 (5): 1369–1401.

ADB (Asian Development Bank). 2005. *Improving the Investment Climate in Indonesia.* Manila, The Philippines. http://www.adb.org/Statistics/pdf/INO-Report-19-May.pdf.

Austria, C. 2005. "Reforms in Energy Markets in South East Asia." Photocopy. The East-West Center, Honolulu, HI.

Austria, C., I. Gkionis, J. Hariri, and P. K. Shrivastava. 2005. "Growth Diagnostics: Identifying the Binding Constraints in Indonesia." Photocopy. John F. Kennedy School of Government, Harvard University, Cambridge, MA.

Becker, G. 1968. "Crime and Punishment: An Economic Approach." *Journal of Political Economy* 76: 169–217.

Bhagwati, J. N., ed. 1982. *Import Competition and Response.* Cambridge, MA: National Bureau of Economic Research.

Caporale, G. M., and M. Cerrato. 2006. "Black Market and Official Exchange Rates: Long-Run Equilibrium and Short-Run Dynamics." Working Paper 1851, Center for Economic Studies/Institute for Economic Research, Munich.

Carter Center. 2005. "The Carter Center 2004 Indonesia Election Report." Atlanta, GA. http://www.carter center.org/documents/2161.pdf.

Claessens, S., S. Djankov, J. Fan, and L. Lang. 1999. "Expropriation of Minority Shareholders in East Asia." Working Paper 2088, World Bank, Washington, DC.

CPI (Center for Public Integrity). 2004. "Global Integrity: An Investigative Report Tracking Corruption, Openness and Accountability in 25 Countries (Focus on Indonesia)." http://www.globalintegrity.org/ reports/2004/2004/country5d40.html?cc=id.

CPJ (Committee to Protect Journalists). 1999. "Asia 1999: Indonesia." Country report. New York. http:// www.cpj.org/attacks99/asia99/Indonesia.html.

Dean, G. 2001. "Doing Business in Indonesia from a Western Perspective." Report prepared for the East Asia Analytical Unit of the Australian Department of Foreign Affairs and Trade, Canberra. http:// www.okusi.net/garydean/works/bizindo.html.

Dillon, H. S. 1999. "Trade and Food Security: The Case of Indonesia." Paper presented at the International Food and Agribusiness Management Association Conference, "Building Trust in the Agro-Food System: Trade, Technology, and Competitiveness," Florence, Italy, June 14–15. http://www.ifama.org/ conferences/9/1999/Congress/Dillon.PDF.

Dung, L. T. 2003. *Judicial Independence in Transitional Countries.* Oslo, Norway: United Nations Development Programme.

Freedom House. 2004. "Countries at the Crossroads 2004: Country Report—Indonesia." New York. http://www.freedomhouse.org/template.cfm?page=140&edition=1&ccrcountry=50&section=54& ccrpage=5.

———. 2005. "Freedom of the Press." Report on the annual survey. New York. http://www.freedom house.org/template.cfm?page=16&year=2005.

Hausmann, R., D. Rodrik, and A. Velasco. 2005. "Growth Diagnostics." Photocopy. Harvard University, Cambridge, MA.

Heritage Foundation. 2007. "Index of Economic Freedom: Indonesia." Washington, DC. http://www.her itage.org/research/features/index/country.cfm?id=Indonesia.

Hofman, B., E. Rodrick-Jones, and K. W. Thee. 2004. "Indonesia: Rapid Growth, Weak Institutions." Paper prepared for the World Bank's Scaling Up Poverty Reduction Global Learning Process and Conference, Shanghai, May 25–27.

HRF (Human Rights First). 2005. "Indonesia: Importance of an Independent Judiciary." New York. http:// www.humanrightsfirst.org/defenders/hrd_indonesia/hrd_indonesia_01.htm.

Inglehart, R. 1997. *Modernization and Postmodernization: Cultural, Economic, and Political Change in 43 Societies.* Princeton, NJ: Princeton University.

Isham, J., L. Pritchett, M. Woolcock, and G. Busby. 2003. "The Varieties of the Resource Experience: How Natural Resource Export Structures Affect the Political Economy of Economic Growth." Photocopy. World Bank, Washington, DC.

Kaufmann, D., A. Kraay, and M. Mastruzzi. 2003. "Governance Matters III: Governance Indicators 1996–2002." Policy Research Working Paper 3106, World Bank, Washington, DC.

Kaufmann, D., and S-J. Wei. 1999. "Does Grease Money Speed Up the Wheels of Commerce?" Policy Research Working Paper 2254, World Bank, Washington, DC.

Krueger, A. O. 1974. "The Political Economy of the Rent Seeking Society." *American Economic Review* 64 (3): 291–303.

Krugman, P. 1998. "Bubble, Boom, Crashes: Theoretical Notes on Asia's Crisis." Photocopy. Massachusetts Institute of Technology, Cambridge, MA.

Landes, D. S. 1999. *The Wealth and Poverty of Nations: Why Some Are So Rich and Some So Poor.* New York: W. W. Norton.

———. 2000. "Culture Makes Almost All the Difference." In *Culture Matters: How Values Shape Human Progress,* ed. L. E. Harrison and S. Huntington, 2–13. New York: Basic Books.

Lane, P. R., and A. Tornell. 1996. "Power, Growth, and the Voracity Effect." *Journal of Economic Growth* 1 (2): 213–41.

Leite, C., and J. Weidmann. 1999. "Does Mother Nature Corrupt? Natural Resources, Corruption, and Economic Growth." Working Paper WP/99/85, International Monetary Fund, Washington, DC.

Lujala, P. N., P. Gleditsch, and E. Gilmore. 2005. "A Diamond Curse? Civil War and a Lootable Resource." *Journal of Conflict Resolution* 49 (4): 538–62.

Masters, A. 2002. "Challenges to Police Reform in Indonesia." News Brief, September 26, United States–Indonesia Society, Washington, DC.

Mauro, P. 1995. "Corruption and Growth." *Quarterly Journal of Economics* 110 (3): 681–712.

Molyneux, J. I. 2000. "Years of Living Dangerously: NGOs and the Development of Democracy in Indonesia." Paper prepared for the 41st Annual Convention of the International Studies Association, Los Angeles, March 14–18. http://www.ciaonet.org/isa/moj01/.

Murphy, K. M., A. Shleifer, and R. W. Vishny. 1993. "Why Is Rent Seeking So Costly to Growth?" *American Economic Review* 83 (2): 409–14.

Perkins, D. 2004. "Corporate Governance, Industrial Policy and the Rule of Law." In *Global Change and East Asian Policy Initiatives,* ed. S. Yusuf, M. A. Altaf, and K. Nabeshima, ch. 7. Washington, DC: World Bank.

Rauch J., and P. Evans. 1999. "Bureaucratic Structures and Bureaucratic Performance in Less-Developed Countries." Working Paper 99-06, University of California at San Diego.

Sachs, J., and A. Warner. 1995. "Natural Resource Abundance and Economic Growth." Working Paper 5398, National Bureau of Economic Research, Cambridge, MA.

Sala-i-Martin, X., and A. Subramanian. 2003. "Addressing the Natural Resource Curse: An Illustration from Nigeria." Working Paper 9804, National Bureau of Economic Research, Cambridge, MA.

Sato, Y. 2005. "Bank Restructuring and Financial Institution Reform in Indonesia." *Developing Economies* 43 (1): 91–120. http://www.ide.go.jp/English/Publish/De/pdf/05_01_05.pdf.

Seldadyo, H., and J. de Haan. 2005. "The Determinants of Corruption: A Reinvestigation." Paper prepared for the 2005 European Public Choice Society Annual Conference, Durham, UK, March 31–April 3. http://www.dur.ac.uk/john.ashworth/EPCS/Papers/Seldadyo_DeHaan.pdf.

Sen, A. 2005. *The Argumentative Indian: Writings on Indian History, Culture, and Identity.* Oxford, UK: Oxford University Press.

Serra, D. 2004. "Empirical Determinants of Corruption: A Sensitivity Analysis." http://ssrn.com/abstract=560341.

Shleifer, A., and R. W. Vishny. 1993. "Corruption." *Quarterly Journal of Economics* 108 (3): 599–617.

Stern, J. 2003. "The Rise and Fall of the Indonesian Economy." Working Paper RWP03-030, John F. Kennedy School of Government, Harvard University, Cambridge, MA.

Swadaya, B. 1994. "A Country Paper of Indonesia on Promoting Dialogue and Collaboration in Sustainable Agriculture and Rural Development (SARD) between NGOs/RPOs and Government." Food and Agriculture Organization of the United Nations, Rome. http://www.fao.org/wairdocs/ad715e/ad715e00.htm.

TI (Transparency International). 2005. "Global Corruption Barometer." Berlin. http://www.transparency.org/policy_research/surveys_indices/gcb/2005.

———. 2007. "Global Corruption Report 2007: Corruption and Judicial Systems." Berlin. http://www.transparency.org/publications/gcr/download_gcr#download.

UNCTAD (United Nations Conference on Trade and Development). 2003. "Country Report for Indonesia." http://r0.unctad.org/trains_new/country_notes/2003_INDONESIA.PDF.

USAID (U.S. Agency for International Development). 1999. *A Handbook for Fighting Corruption.* Technical Publication Series, Office of Democracy and Governance, Washington, DC.

U.S. Department of State. 2003. "Indonesia: Investment Climate 2003." Embassy of the United States, Jakarta, Indonesia. http://jakarta.usembassy.gov/econ/investment.html.

———. 2005. "Background Note: Indonesia." Washington, DC. http://www.state.gov/r/pa/ei/bgn/2748.htm.

Weber, M. 1905. "Die protestantische Ethik und der 'Geist' des Kapitalismus." *Archiv fur Sozialwissenschaft u. Sozialpolitik* 20: 1–54.

Whitehead, M. 2003. "Fighting Corruption in Sub-Saharan Africa: Can We Win the War?" Pricewater-houseCoopers, New York.

Witoelar, E. 2001. "Governance Reform in Indonesia." Report prepared for the Interim Meeting of the Consultative Group on Indonesia, April 24, Jakarta. http://www.indonesia-ottawa.org/economy/CGI/IntCGI-GOI-Gov.pdf.

World Bank. n.d. "Six Questions on the Cost of Corruption with World Bank Institute Global Governance Director Daniel Kaufmann." http://go.worldbank.org/KQH743GKF1.

———. 2003. "Combating Corruption in Indonesia: Enhancing Accountability for Development." Washington, DC. http://siteresources.worldbank.org/INTINDONESIA/Resources/Publication/03-Publication/Combating+Corruption+in+Indonesia-Oct15.pdf.

———. 2004. "Local Conflict in Indonesia: Incidence and Patterns." *Social Development Notes: Conflict Prevention and Reconstruction* 19.

———. 2007. *World Development Indicators.* Washington, DC. http://web.worldbank.org/WBSITE/EXTERNAL/DATASTATISTICS/0,,contentMDK:21298138~pagePK:64133150~piPK:64133175~theSitePK:239419,00.html.

3

Unemployment Compensation and the Risk of Unemployment: The Case of Argentina

Ana Lucía Iturriza

This chapter proposes an econometric model to estimate the impact of the unemployment compensation programs currently in place in Argentina on the labor transitions of unemployed workers. The author considers whether these programs introduce disincentive effects that influence the search efforts of unemployed workers and thus affect their probability of abandoning unemployment. The report addresses Argentina's unemployment insurance (UI), which represents a passive labor market intervention, and the Plan Jefes y Jefas de Hogar Desocupados, which represents an active intervention. That plan has the characteristics of an unemployment assistance (UA) policy. The analysis relies on Argentine household data contained in the Permanent Household Survey that Instituto Nacional de Estadística y Censos (INDEC), the bureau of statistics, conducts periodically. These data are used to construct a panel of individuals who were unemployed in October 2002 and remained active in the labor force in May 2003. The data support identification of insured and assisted workers. They contain information on transitions between unemployment and employment and on the duration of unemployment periods. Other individual characteristics identified from the data include demographic variables, level of education, region of residence, and characteristics of the last occupation. In line with the literature on unemployment compensation, this study's empirical strategy consists of applying binary logit models to analyze the effects of UI and UA on the probability of moving from unemployment to employment. Likewise, the Cox proportional hazards model is used to estimate the effect of UI and UA on the duration of unemployment periods. The Kaplan-Meier estimator also is computed for a nonparametric analysis of the events. To address the specifics of the Argentine case, the analysis is performed for two different scenarios. The first scenario (classification 1) considers beneficiaries of Plan Jefes to be employed, whereas the second scenario (classification 2) treats these beneficiaries as unemployed. For the first scenario, UA appears to be an efficient instrument that favors the move from unemployment to employment and does not introduce disincentive effects. Results of the logit and Cox models consistently show that assistance participants and applicants exhibit a greater likelihood of transitioning to employment and have shorter periods of unemployment that follow from their higher hazards to employment. In the second scenario, strong demotivating effects associated with the use of the assistance program cast doubts about the efficiency of the instrument as an engine for employment. According to logit and Cox models, unemployed workers who receive assistance face significantly lower probabilities of becoming employed and lower hazards to employment that translate into longer periods of unemployment. Disincentive effects on job-search efforts also are worrisome because assistance benefits are granted on an unlimited basis. The use of UI was not found to affect the employment behavior of participating workers. That result is similar in both classifications analyzed and follows from the low significance that the variable exhibited in logit and Cox models. This suggests that there are no disincentive effects associated with the use of UI.

Since 1990, Argentina has experienced poor labor market outcomes. Among other trends, the distressing increase of open unemployment stands out. Between 1990 and 2003, the number of unemployed workers tripled, reaching more than 2.7 million (20 percent of the active population) in 2003.[1] Successive administrations have used different passive and active interventions to protect workers against the risk of unemployment and to offset the effects of income loss resulting from unemployment.[2]

Among passive policies, the most comprehensive program currently in place is unemployment insurance (UI). Created in 1991, it provides monthly income to unemployed workers previously engaged in the formal sector and able to show contributions to the social security system. The amount of the benefit and the length of the entitlement differ from case to case, depending on individual labor paths. The number of insured workers peaked in 2002, surpassing 200,000.

Among active interventions, the most significant program is the program for unemployed heads of household (Plan Jefes y Jefas de Hogar Desocupados, hereafter Plan Jefes), which has been in place since 2002.[3] It consists of a monthly allowance for every household head who reports being unemployed. The benefit is granted on a flat-rate basis, and the benefit duration is unlimited. Participants may receive the benefit as a subsidy,[4] or it may be conditional on a labor contribution (counterpart of work) that typically assumes the form of a communitarian job. For most beneficiaries, the counterpart represents their main labor activity and the benefit represents their main source of income. By 2002, 84 percent of the almost 2 million unemployed people registered in Plan Jefes received conditional benefits.[5]

The Argentine system of unemployment compensation is dominated by two main programs: (1) the standard UI and (2) the relatively more recent unemployment assistance (UA). Although a number of investigators have studied various aspects of the active and passive policies, the effects of unemployment benefits on the incidence and duration of unemployment have not been examined fully. It is likely that interventions of such magnitude must affect several aspects of the economy and, fundamentally, aspects related to labor market composition.

Economic theory hypothesizes that unemployment compensation may have a harmful effect on employment-seeking behavior, with high benefits causing unemployed people to be unwilling to accept jobs (Atkinson and Micklewright 1991). The general consensus is that there is a positive relationship between benefits and unemployment, and this relationship has become the standard prediction in labor economics.

Several investigators have tested that prediction. In countries belonging to the Organisation for Economic Co-operation and Development (OECD), the generalized use of UI prompted the writing of numerous reports analyzing the effects of UI benefits on unemployment. From the early studies of Katz and Meyer (1988) until the investigation by Kuhn and Riddell (2006), UI has been a topical issue. Evidence concerning UA has been slower in coming and the literature

---

1. Written in 2006, this report includes labor data through 2003. Data were gathered from the Argentine Ministry of Labor, Employment, and Social Security Web site, http://www.trabajo.gov.ar.

2. Passive policies consist of a transfer of resources to support the level of income of the unemployed. Active interventions pursue two objectives: (1) to increase the labor demand in adverse conjunctures and (2) to improve the employability of certain vulnerable population groups. Active policies are classified as direct employment programs when the jobs created are in the public sector and as indirect employment programs when the government establishes subsidies or other incentives to foment private employment (Beccaria 2001).

3. Strictly speaking, the program falls into the category of active labor market interventions and, within them, into the modality of direct employment creation. In this report, Plan Jefes is considered an assistance program with work requirements—a "workfare" program.

4. The criteria to receive the compensation as a subsidy are not clear in the legislation. Under workfare programs, the modality of subsidy generally is valid for people who are not able to work.

5. Data taken from the Argentine Ministry of Labor, Employment, and Social Security Web site, http://www.trabajo.gov.ar.

on it is growing. Studies for transition economies constitute an advance in this respect, significantly represented by Micklewright and Nagy (1998).

In Argentina, studies have focused on different aspects of the assistance programs. Particularly for Plan Jefes, Galasso and Ravallion (2003) and Roca et al. (2003) examined the impact of the program on poverty alleviation and social inclusion, confirming the efficiency of the intervention to protect individuals against poverty and indigence. Likewise, the impact of the program on aggregate demand was estimated (MTESS 2002).

Less attention has been devoted to the impact of the programs on the risk of unemployment.[6] The work of Martin Ravallion is an example of research in this area. By applying propensity score matching methods, his study revealed that, in the early stages of Plan Jefes implementation, the rate of unemployment fell by 2.5 percent as a result of the plan's introduction.

The absence of research is more evident in the field of UI, so this report tries to fill that gap by examining the effects of UI and UA on the risk of unemployment. The main aim is to determine whether unemployment benefits reduce recipients' job-seeking efforts and affect their probability of gaining employment.

Labor market transitions constitute the framework to analyze changes between employment and unemployment status.[7] The effects of the compensation on the risk of unemployment are estimated by modeling both the transition and the hazard rate from unemployment to employment, and by looking at how these factors change in the presence of benefits. In duration models, higher hazard rates to employment imply shorter periods of unemployment. If UI or UA is found to reduce the transition or the hazard to employment, it is an indication of the existence of disincentive effects associated with the benefits. In a context in which persistent unemployment may damage individual employability, attempts to investigate this subject are relevant issues for the study of public intervention.

The analysis conducted for this report relies on data provided by the Argentine Instituto Nacional de Estadística y Censos (Bureau of Statistics, INDEC). These data are used to construct a panel of individuals who were unemployed in October 2002. The data support identification of insured and assisted workers, and they contain information on labor transitions as well as duration of unemployment periods. Other individual characteristics identified include demographic variables, level of education, region of residence, and characteristics of the last occupation.

It is important to note that, since the 2002 implementation of Plan Jefes, official statistics have been adapted to distinguish between employment derived from the plan (assisted employment) and other employment (nonassisted employment). As a result, INDEC periodically presents different sets of labor market indicators based on alternative classifications of beneficiaries.[8]

Classification 1 relies on a broad definition of employment, and it includes assisted and nonassisted forms of work. Plan Jefes beneficiaries are classified into the labor force as employed, unemployed, or inactive if they are working for the plan, not working but looking for a job, or not working and not looking for a job, respectively. Under classification 1, for example, 84 percent of the beneficiaries reporting Plan Jefes as their main activity enter the survey as employed and remain employed one period later if they are still enrolled in the plan.

Classification 2 relies on a restrictive definition of employment, and it includes only nonassisted forms of employment. Beneficiaries who report Plan Jefes to be their main activity are considered unemployed. In this case, most of the participants enter the survey as unemployed and the benefit is treated as any other individual attribute.

The distinction between classifications is relevant in the discussion of policy interventions because each classification implies a different concept of employment. Setting these classifications as the two scenarios for computing unemployment, the empirical strategy for this study

---

6. A standard method to evaluate the risk of unemployment is to consider its incidence and its duration (Galiani and Hopenhayn 2001).

7. Inactivity is not modeled in this report.

8. INDEC actually presents three indicators but only two of them are used in this study.

consists of applying binary logit models to analyze the effects of UI and UA on the probability of transitioning from unemployment to employment. The study computes the nonparametric Kaplan-Meier (KM) estimator and applies the Cox proportional hazards model to estimate the effect of UI and UA on the duration of unemployment periods.

This report is organized as follows: The next section describes the Argentine labor market between 1991 and 2003, presents the technicalities of UI and UA, and introduces alternative classifications of beneficiaries in the labor force. The next section focuses on theoretical background, stylized facts, and empirical evidence regarding unemployment compensation. That section is followed by a discussion of the econometric methods usually found in the literature to model unemployment compensation. Described next are the data set used in this study and the statistics of the sample. Results of the regressions follow, and the final section summarizes the discussion and provides some concluding remarks.

Argentine Labor Market and Unemployment Benefits

According to the labor indicators, the decade of the 1990s denoted a major decline in the conditions of the Argentine labor market. There was poor employment performance and an increase in all forms of labor underutilization: unemployment, underemployment, and informal work. Table 3.1 presents the basic indicators for selected years.

Between 1991 and 2003, the number of unemployed people tripled while employment expanded only 20 percent. The weakness of the occupational situation translated into a fall in the level of incomes, and from that point the increase in poverty was immediate. At the beginning of 2000, INDEC reported that 28 percent of the households and 38 percent of the population in urban areas were below the poverty line. These totals rose to 46 percent and 58 percent, respectively, by October 2002.

From 2003 onward, economic recovery and intense public action led to an upturn in employment levels. After four years, however, it is evident that the fracture in the labor relationships altered the social and economic order to various degrees, in turn provoking different

Table 3.1. *Argentine Labor Market Indicators, Selected Years, 1991–2003*

Indicator	1991	1993	2000	2001	2002	2003
Population (thousands)						
Total population	28,447	29,426	32,842	33,484	34,124	34,393
Inactive population	17,408	17,671	19,197	19,575	19,989	20,000
Active population	11,039	11,755	13,644	13,909	14,135	14,393
Unemployed population	748	1,096	2,031	2,375	2,737	2,202
Employed population	10,291	10,660	11,613	11,534	11,397	12,191
Underemployed population[a]	963	1,092	1,972	2,178	2,696	2,647
Rate (%)[b]						
Activity rate	39.5	41.3	42.6	42.5	42.4	42.8
Employment rate	37.0	37.3	36.2	35.2	34.1	36.2
Unemployment rate	6.5	9.6	15.1	17.4	19.7	15.6
Underemployment rate	9.4	10.2	17.0	18.9	23.7	21.7
Informal workers[c]	29.7	31.3	37.7	38.3	40.9	44.8

Source: Ministerio de Trabajo, Empleo, y Seguirdad Social data.

Note: Year averages, except for 2003, data from May only.

a. Term-related underemployment (employed people who worked less than 35 hours per week and wanted to work more hours).

b. Rates calculated with standard definitions: activity rate = active population/total population; employment rate = employed population/total population; unemployment rate = unemployed population/active population; underemployment rate = underemployed population/employed population.

c. Percentage of salaried workers outside the regulated labor market.

Table 3.2. *Benefits: Unemployment Insurance*

- Benefits are available to unemployed workers (those without employment who are available to work and are actively seeking employment), who present at least six months of contributions during the three years preceding unemployment.
- Benefits are set at a percentage of the highest net wage earned in the six months preceding unemployment.
- Duration of the entitlement depends on previous contributions; ranges from two to 12 months.
- Recipients must accept the jobs offered by the labor authority.

Source: Author's elaboration, based on the 1991 Employment Law.

Table 3.3. *Unemployment Insurance Recipients, 1994–2005*

Year	Unemployed workers	UI recipients	UI-covered workers (% of unemployed population)
1994	1,327,892	98,513	7.42
1995	2,085,622	122,347	5.87
1996	2,068,966	128,672	6.22
1997	1,880,920	95,379	5.07
1998	1,633,583	90,711	5.55
1999	1,843,306	114,176	6.19
2000	2,031,330	124,535	6.13
2001	2,375,446	144,738	6.09
2002	2,737,130	200,398	7.32
2003	2,202,000	105,371	4.79
2004	—	62,407	—
2005	—	61,674	—

Source: Author's elaboration, based on Bertranou and Bonari (2005) and Ministerio de Trabajo, Empleo, y Seguridad Social data.

Note: — = not available; UI = unemployment insurance.

needs for intervention. The national programs of insurance and assistance were put in place in 1991 and 2002, respectively, and their characteristics reflect the motivations and objectives that guided the public policy in those two particular years.

Unemployment Insurance

The Argentine legislature introduced limited-duration UI at the end of 1991 when the Employment Law was approved.[9] Table 3.2 summarizes the terms of access to the benefits, and table 3.3 shows the evolution of the number of insured workers from 1994 through 2005.

Unemployment Assistance

In an economic context that had changed drastically, Plan Jefes was implemented in 2002. Decree No. 565/2002[10] declared the need to "guarantee the right to social inclusion to all the Argentinean families, having been declared the social, economic, administrative, financial, monetary, and occupational emergency." Table 3.4 describes the benefits of the assistance program, and the inclusive nature of the plan can be inferred from its conditions of eligibility. Table 3.5 presents the numbers of individuals receiving assistance annually between 2002 and 2005.

---

9. This law is available at http://infoleg.mecon.gov.ar.
10. The decree is available at http://infoleg.mecon.gov.ar.

Table 3.4. *Benefits: Unemployment Assistance*

- Benefits are available to unemployed heads of household (those without employment who are available to work and are actively seeking employment) with children under 18 years of age or handicapped at any age; benefits do not depend on previous occupational experience.
- Flat-rate benefits are set at one-third the minimum wage when implemented.
- Duration of the entitlement is unlimited.
- Participants may be asked to provide one of the following forms of counterpart: work in communitarian activities, completion of formal education, assistance in training programs, performance of administrative tasks in local agencies, or work in enterprises ascribed to the program.
- Benefits are compatible with other social programs.

Source: Author's elaboration, based on Decree No. 565/2002.

Table 3.5. *Unemployment Assistance Recipients, 2002–05*

Year	Unemployed workers	UA recipients	UA-covered workers (% of unemployed population)
2002	2,737,130	1,793,769	73.1
2003	2,202,000	1,987,875	81.7
2004	—	1,729,410	—
2005	—	1,500,000[a]	—

Source: Author's elaboration, based on Ministerio de Trabajo, Empleo, y Seguirdad Social data.
Note: — = not available; UA = unemployment assistance.
a. Preliminary information.

The plan includes among its eligibility conditions a contribution of labor. This measure, one of the main innovations of the program, has sparked controversy in the debate over public policies (Roca et al. 2003). People have questioned whether the activities performed by beneficiaries should be considered employment. The following section summarizes the debate.

Double Classification

As a convention, official statistics in Argentina include as "employed" those beneficiaries of social plans who carry out any type of activity to fulfill whatever work requirements a social plan imposes (MECON 2003). In the case of Plan Jefes, the adequacy of that criterion was carefully reconsidered by the (statistics) authorities because the large number of plan participants significantly alters the indicators (see INDEC 2002). Distinguishing between assisted and nonassisted employment has been recommended.

Providing a counterpart of work (as required of plan beneficiaries wishing to receive unemployment assistance) may differ from occupying a job or engaging in a productive activity (Módolo 2004). According to the terms of the regulation, plan benefits are intended to compensate for the lack of income in a transitory situation of unemployment, not to serve as a normal job wage in the modern sense (Pellegrini et al. 2003).

There is also a theoretical reason for distinguishing between assisted and nonassisted employment. The literature differentiates regular from marginal jobs: regular jobs are full-time, imply an expectation of continued employment, and are covered by statutory employment protection; marginal jobs lack one or more of those attributes. Regular and marginal jobs are associated with different patterns of transition between labor market states (Atkinson and Micklewright 1991).

Because the characteristics of beneficiaries' labor activities vary widely, it would complicate this analysis to include all of those activities in the category of regular jobs. INDEC computes and presents two sets of indicators that this study uses. The report terms these sets "classifica-

tion 1" and "classification 2." They respond to the aggregates described in the introductory portion of this report.

Theoretical Background

Stylized Facts

The economics of unemployment compensation predict that the effects derived from introducing payment programs for unemployed people are many and they do not always converge. Vodopivec (2004a) explained that the benefits change the opportunity cost of leisure and may affect employment decisions, labor force participation, and unemployment. UI and UA may influence job-search intensity, postunemployment wages, the labor supply of other family members, and the choice between regular and informal work.

How job-search intensity and postunemployment wages are affected can be determined by the wage-search model proposed by Mortensen in 1986. That framework described the behavior of a representative unemployed worker looking for a job in a decentralized labor market. With imperfect information about the locations of available jobs and their associated wages, the job seeker goes through an information-gathering process that is sequential and costly. The worker faces a demand for her services represented by an exogenous distribution of job offers and a constant rate at which these offers arrive. She establishes a reservation wage, determined by access to other sources of income (among other factors) and the value of her leisure or home production. (In the context of unemployment compensation, the value of leisure includes the benefit paid to covered workers.) Given the parameters of the Mortensen model, the worker has to decide whether to accept a wage offer or to continue searching. Technically, Mortensen's job seeker solves a dynamic programming problem, balancing two flows of income: (1) the income from accepting an offer today at a certain wage against (2) the wage improvement over this offered wage expected from holding out, where the improvement is an infinite stream and must be discounted at a rate (Atkinson and Miclewright 1991). An individual will stop searching when the highest offered wage in any period is equal to or in excess of the reservation wage (Mortensen 1986).

One of the implications of the Mortensen model is that unemployment benefits unambiguously increase unemployment through their effects on postunemployment wages. Benefits improve the unemployed worker's bargaining position and lead to higher wages and thus to a higher equilibrium unemployment (Vodopivec 2004b).

For the impact of benefits on job-search intensity, two opposite effects derive from the model. First, benefits reduce a recipient's search effort by reducing the costs of unemployment. The reservation wage increases and the probabilities of receiving an acceptable job offer fall, thus expanding the duration of unemployment. Second, unemployment benefits allow a more intense job search. This intensity raises the rate at which job offers arrive, thus expanding the probabilities of receiving an acceptable job offer and shortening the duration of unemployment.

Between these two contradictory effects it generally is assumed that an increased reservation wage overwhelms an increased search intensity, and that assumption leads to the main implication of the model: the higher the reservation wage, the lower the hazard to employment (a function that represents the exits from unemployment to employment). Benefits increase reservation wages (or decrease the hazards to employment), and workers who receive benefits are likely to experience longer periods of unemployment (Mortensen 1986). Conversely, the model predicts a falling reservation wage (or rising hazards to employment) as the termination of the benefit approaches, which will be monotonic due to the stationary value of the benefits (Meyer 1988).[11]

---

11. Monotonicity is a property of some functions. The function always grows or always decreases, but a monotonic function does not show oscillations. In the present case, because the amount of the benefits does not change (and they have a stationary value), the reservation wage will decrease monotonically.

The ambiguity of economic theory makes the context favorable for empirical studies. Tzannatos and Roddis (1998) found that evidence generally has confirmed a positive relationship between the generosity of benefits and the unemployment rate. This effect comes primarily through an increase in the duration of unemployment rather than in the incidence of unemployment.[12] That is, the availability of benefits does not induce workers to stop working, but it does reduce the pressure for reemployment when a worker has become unemployed.

To describe the evidence in more detail, it is necessary to distinguish between studies related to UI and to UA, and, within these categories, between studies concerned with the dimension of benefit level (or replacement rates) and those concerned with the duration of entitlement.

Empirical Evidence

A standard way to measure the effects of benefits on the duration of unemployment is to measure benefit elasticity (that is, the percentage increase in the duration of unemployment resulting from a given percentage increase in the benefit replacement rate) and duration elasticity (which similarly relates the duration of unemployment to the potential duration of benefits) (Vodopivec 2004b).

OECD countries have looked mainly at the effects of UI, and the results are far from robust (Atkinson and Miclewright 1991). The *Employment Outlook* (OECD 1991) reported that studies for the United Kingdom and the United States have estimated that a 1.0 percent increase in the benefit level increases the duration of unemployment by 0.6–1.0 percent. To the contrary, however, Arranz and Muro (2004) stated that a number of studies found UI to have no effect on unemployment duration. Those authors cited Germany, The Netherlands, and the United States as examples of null effects.

In the United States, duration elasticity was found to be in the range of 0.4–0.5, meaning that a one-week increase in the potential entitlement duration is associated with a 1.0–1.5-day increase in the average recipient unemployment period (Katz and Meyer 1988).

In Poland, recipients in early stages of the 12-month period of entitlement have shown a hazard that is 77 percent lower than the hazard of nonrecipients. When the expiration of benefits approached, however, the results reversed and recipients exhibited higher hazards than did noncovered unemployed workers (Adamchick 1999).

The literature on UA is scarce (Arranz and Muro 2004). Those authors, reporting studies for transition economies, found that UA levels discouraged the search effort of unemployed workers in Hungary, and that the effect of UA was null in Romania. For the Czech Republic and Romania, they reported that the duration of UA produced a disincentive effect on the hazards to employment. Also reporting on Hungary, Micklewright and Nagy (1998) found that unemployment appeared rather inelastic to changes in benefits.

In sum, the evidence concerning UI is abundant and the studies generally but not exclusively have found that unemployment benefits produce disincentive effects on job-search efforts. Information about UA is more belated and embryonic, with much yet to be reported.

Despite the mixed reports, theory has achieved a certain consensus and the findings of Layard, Nickell, and Jackman (1991) generally are taken as a summary of the state of the art (Calmfors and Holmlund 2000; Vodopivec 2004b). Layard, Nickell, and Jackman stated that the elasticity of the expected duration of unemployment with respect to benefits is generally in the range of 0.2–0.9, depending on the conditions of the labor market and the country concerned.

---

12. Duration of unemployment, rate of unemployment, and inflow to unemployment are related by definition. In a given population of labor force participants, the steady-state fraction of people who are unemployed is equal to the product of the average frequency (inflow) and duration of unemployment periods (Mortensen 1986).

The positive relationship between unemployment benefits and unemployment duration has become the standard prediction in labor economics.

Econometric Methods

Nonparametric Approach

Regarding the empirical strategies used to measure the disincentive effects of unemployment compensation, the published reports were guided by the availability of panel data to follow labor transitions through successive rounds of observation. Departing from the two-state model of employment and unemployment, most of the studies started by applying nonparametric methods to determine the pattern of exits from unemployment relative to time. That determination is usually done on the basis of a hazard function.

Hazard functions relate each individual in the population at risk with the probability that an event will occur in a given interval (provided that it has not occurred before the beginning of the interval) (Pollmann-Schult and Buchel 2005). In the case of unemployment duration models, the present study computed, in each period, the number of workers whose unemployment periods ended (*failures*) and related those numbers to the number of individuals who continued to be unemployed (*censored*). This method relies on the idea that estimates are affected when some of the lifetimes are unavailable because the corresponding items have been lost to observation or their lifetimes are still in progress when the data are analyzed. Such items cannot simply be ignored because they tend to be longer-lived than the average (Kaplan 1983).

Formally, the probability that a period of unemployment lasts until period t can be represented in terms of a cumulative distribution function:

$$F(t) = Pr(T \leq t). \tag{3.1}$$

This cumulative distribution function has an associated probability distribution function:

$$f(t) = \frac{dF(t)}{dt}. \tag{3.2}$$

To analyze the permanence of individuals in unemployment, a survival function can be constructed with the complement of the primitive function:

$$S(t) = 1 - F(t) = Pr(T > 5). \tag{3.3}$$

The hazard function can be written in terms of its definition, the probability of verifying the risk:

$$\lambda(t) = \frac{f(t)}{S(t)} = -\frac{d(\ln S(t))}{dt}. \text{[13]} \tag{3.4}$$

The KM estimator (INEI 2000) is an empirical instrument to operationalize the hazard rate, which can be computed as

$$S(t) = \prod_{i=1}^{n} (n_i - h_i) / n_i = \prod_{i=1}^{n} (1 - \lambda_i), \tag{3.5}$$

where h_i is the number of completed unemployment periods and n_i is the number of ongoing periods in period t.

---

13. By properties of derivatives, $- d \ln S(t) / dt = S'(t) / S(t)$, $S(t) = 1 - F(t)$, $S'(t) = 0 - F'(t) = - f(t) \Rightarrow S'(t) / S(t) = - f(t) / S(t)$.

The KM estimator is a strictly empirical, nonparametric approach to estimating survival and hazard functions (Greene 2002). Because it relies only on the observed periods to determine the hazard, the estimator implicitly assumes that the population involved is homogeneous.

Semiparametric Approach

The KM estimator provides a descriptive analysis of the shape of the hazard function and points the investigator to the need for further research. The literature indicates that the assumption of homogeneity that is implicit in the KM estimator is a drawback to the estimating process. The observation that workers who leave unemployment first may display different characteristics than workers who exit later or remain unemployed prompts the use of parametric estimation.

To estimate the impact of benefits on survival after adjusting for other explanatory variables (or after controlling for observed heterogeneity), duration data are modeled as the combination of a baseline hazard and a mixing distribution. The baseline hazard represents structural duration dependence, and the mixing distribution represents unobserved heterogeneity (Paserman 2004). The semiparametric estimation of the hazard function has been done classically with the Cox proportional hazards model:

$$\lambda_i(t) = \lambda_0(t) \exp(z_i(t)'\beta). \tag{3.6}$$

Equation (3.6) expresses the hazard as the product of two functions. The first function, $\lambda_0(t)$, is the baseline hazard at time t, unknown, unspecified, common to all individuals, and dependent on the actual duration of unemployment; it measures duration dependency. The second function describes the way in which the hazard shifts at given points in time between individuals with different characteristics. Because of the nonnegativity of the hazards, it is an exponential function, where $z_i(t)$ is a vector of explanatory variables for individual i at time t, and β is a vector of unknown parameters (Karni 1999; Lancaster 1979; van Opstal and Theeuwes 1986).

The Cox model does not assume a particular distribution for the survival times; rather, it assumes that the effects of the different variables on survival are constant over time and are additive in a particular scale (Walters 2000).

Following Meyer (1995), the probability that a period of unemployment lasts until $t+1$, conditional on its lasting up to period t, is given by the following equation:

$$\Pr[T_i \geq t + 1 \mid T_i \geq t] = \exp\left[-\int_t^{t+1}\lambda_i(u)du\right], \tag{3.7}$$

where T_i is the duration of individual i unemployment period. If $z_i(t)$ is assumed constant between t and $t+1$, then, substituting for λ_i from equation (3.7), we get

$$\Pr[T_i \geq t + 1 \mid T_i \geq t] = \exp\left[-\left[\int_t^{t+1}\lambda_0(u)du\right]\left[\exp\{z_i(t)'\beta\}\right]\right] \tag{3.8}$$

$$= \exp\{-\exp[g(t) + z_i(t)'\beta]\}, \text{ where}$$

$$\gamma(t) = \ln\left\{\int_t^{t+1}\lambda_0(u)du\right\}.$$

To construct the likelihood that the periods are classified into failure ($\delta_i = 1$) and censored ($\delta_i = 0$),

$$L(\gamma, \beta) = \prod_{t=1}^{N}\left([1 - \exp\{-\exp]\gamma(k_i)'\beta\}]^{\delta_i} \prod_{t=0}^{kt-1} \exp\{-\exp[\gamma(t) + z_i'\beta]\}\right), \tag{3.9}$$

which can be expressed as a function of a finite number of parameters and can be maximized in the following manner:

$$L(\gamma, \beta) = \sum_{t=1}^{N}\left\{\delta_t \log[1 - \exp\{-\exp[\gamma(k_i) + z_i(k_i)'\beta]\}] - \sum_{t=0}^{ki-1}\exp[\gamma(t) + z_i(t)'\beta]\right\}. \tag{3.10}$$

Semiparametric analysis is relevant because the shape of the baseline hazard is often irregular and unlikely to be well approximated by a simple parametric form (Meyer 1995). This outcome concerns unemployment compensation modeling because irregularities may be caused by the presence of benefits that are about to expire.

Parametric Approach

Reports in the literature suggest parametric analysis to model the hazard rate. Equation (3.6) is corrected by including an error term with a known distribution to control for unobserved heterogeneity. The term included allows for error in specifying the systematic sources of variation of the hazard function due to the omission of relevant regressors (Lancaster 1979). Among those authors who have proposed fully parametric analysis, Lancaster (1979) suggested using the Weibull distribution to model the baseline hazard and the gamma distribution for the error term. Van Opstal and Theeuwes (1986) experimented with Weibull and Gompertz models for the baseline hazard and with gamma and log-normal distributions for the error term.

Parametric methods, however, are not the most frequently used methods to estimate unemployment duration because theory does not provide clear criteria to select the correct distribution. Rather, the correct distribution must be chosen on the basis of empirical trials (van Opstal and Theeuwes 1986). A misspecified baseline hazard causes all parameters estimates to be inconsistent (Meyer 1995).

Empirical Strategy

The present study combined nonparametric and semiparametric methods to model unemployment duration. This approach follows the existing literature (Adamchick 1999; Arranz and Muro 2004; Meyer 1995). For the reasons already explained, parametric methods were not used in the present study.

To model the incidence of unemployment, transitions across labor market states were modeled on the basis of binary logit models, an approach inspired by earlier investigators (see Cerimedo 2004).[14]

Data Analysis

Characteristics of the Data Set

For the analysis of labor market issues, Argentina counts on the information from the Permanent Household Survey conducted periodically by INDEC. The survey retrieves a set of indicators collected at household and individual levels to classify the people according to their demographic structure, their insertion into the process of production, and their participation in income distribution (Pok and Lorenzetti 2004). The survey is designed to cover urban areas, reaching an average of 25,000 households and 72,500 individuals per round—figures representative of 70 percent of the total urban population. It has a rotating panel structure, with 25 percent of households replaced in each round. Until May 2003, the survey had a semester periodicity, carried out in May and October.

For reasons of information availability, the data set used in the present study is the panel formed with the rounds done in October 2002 and May 2003. Although Plan Jefes was implemented at the beginning of 2002, it was in October 2002 that an extra module of descriptors was

---

14. Because logit models have been used extensively in empirical economics, the details of their application are not discussed here. For a full discussion of them, see Greene (2003).

added to the survey to capture information related to the plan. May 2003 was chosen as the ending point of the study period because it was the last round in which the survey was conducted in the manner described. From the second semester of 2003 onward, several aspects of the survey were changed in ways that made the survey instruments incomparable.[15]

The data set available for the current analysis contained information on approximately 21,420 individuals aged 16–64 years who made up the common part of the two survey rounds. The databases were merged through a linking variable that concatenated the area of residence, the code of the household, and each individual's date of birth. The resulting data set was controlled and corrected by removing the observations that showed inconsistencies in the variables *gender* and *age.* Table 3.6 enumerates the survey observations and the valid observations remaining after correcting for inconsistencies.

Descriptive Statistics

Table 3.7 shows the composition of Argentina's labor market in October 2002, according to the classification 1 framework. It displays the distribution of the sample among employed, unemployed, and inactive groups. It also shows the shares of unemployed people receiving assistance, applicants for assistance, and insured people.

Of the individuals reporting unemployment in the first period, the study focused on those who remained in the labor force in the second period, either as employed or as unemployed workers. Table 3.8 defines the flows out of unemployment for different groups of the popula-

---

15. Among other changes, aspects related to periodicity and survey coverage, as well as fundamental definitions, were modified.

Table 3.6. *Observations Forming the Study Data Set*

Panel, step by step	Number	Panel, step by step	Number
Total observations, October 2002	83,403	Inconsistencies in age variable	316
Total observations, May 2003	61,480	Aged less than 16 years	10,915
Observations made only in October 2002	47,506	Aged greater than 64 years	2,894
Observations made only in May 2003	25,583	Valid observations, after correcting for inconsistencies	21,420
Observations made in both rounds	35,897		
Inconsistencies in gender variable	352		

Source: Author's elaboration, based on the Permanent Household Survey, October 2002 and May 2003 rounds.
Note: The level of permanence in the survey is lower than the theoretical 75 percent. The merged subsample represents, respectively, 43 percent and 58 percent of the October and May samples. The drop in the number of households interviewed probably is explained by the changes in the design of the survey that were already in progress by May 2003.

Table 3.7. *Labor Market Status, Classification 1, October 2002*

Panel population	All	People without benefits and nonapplicants	People with UA	Applicants	People with UI
Sample size (n)	21,420	19,363	1,304	668	85
Employed (n)	11,312	9,901	1,135	258	18
Unemployed (n)	2,228	1,919	46	207	56
Inactive (n)	7,870	7,533	123	203	11

Source: Author's elaboration, based on the Permanent Household Survey, October 2002 and May 2003 rounds.
Note: UA = unemployment assistance; UI = unemployment insurance.

Table 3.8. *Transitions Out of Unemployment, Classification 1, October 2002–May 2003*

Panel population	All	People without benefits and nonapplicants	People with UA	Applicants	People with UI
Unemployed workers (n), October 2002	2,228	1,919	46	207	56
Transitions out of unemployment, absolute values					
To employment (n)	916	773	27	92	24
To unemployment (n)	709	622	9	55	23
To inactivity (n)	603	523	10	60	9
Transitions out of unemployment (%)					
To employment	41.1	40.3	58.7	44.4	42.9
To unemployment	31.8	32.4	19.6	26.6	41.1
To inactivity	27.0	27.3	21.7	29.0	16.1

Source: Author's elaboration, based on the Permanent Household Survey, October 2002 and May 2003 rounds.
Note: UA = unemployment assistance; UI = unemployment insurance.

Table 3.9. *Labor Market Status, Classification 2, October 2002*

Panel population	All	People without benefits and nonapplicants	People with UA	Applicants	People with UI
Sample size (n)	21,420	19,363	1,304	668	85
Employed (n)	10,233	9,901	56	258	18
Unemployed (n)	3,430	1,919	1,248	207	56
Inactive (n)	7,746	7,532	0	203	11

Source: Author's elaboration, based on the Permanent Household Survey, October 2002 and May 2003 rounds.
Note: UA = unemployment assistance; UI = unemployment insurance.

tion. As the numbers reveal, the most probable transition out of unemployment was to employment. Of the original total of 2,228 people unemployed, 916 (41 percent) moved to employment. Likewise, 709 people (32 percent) remained unemployed, and 603 (27 percent) dropped out of the labor force entirely. The same interpretation is valid for the other population groups included in the table.

Under classification 2, Plan Jefes participants were reallocated with reference to their employment status. Those who performed the counterpart as their main activity were considered unemployed. These cases were detected in the sample by applying the filters determined by INDEC (see INDEC 2002).

Table 3.9 summarizes the labor market composition for classification 2. Almost all of the beneficiaries were reallocated to the unemployed group, representing 36 percent of the total.

Table 3.10 reveals the transitions out of unemployment for classification 2 individuals who were unemployed in October 2002. Half of the unemployed workers remained unemployed—1,722 of 3,430 (50 percent). Thirty percent (1,036) of the originally unemployed workers transitioned to employment, and the remaining 672 (20 percent) unemployed people dropped out of the labor force.

The descriptive analysis concludes with the socioeconomic characteristics of the unemployed. Table 3.11 presents the descriptive statistics for alternative classifications. The characteristics of the beneficiaries of Plan Jefes are shown as well. The variables, defined in the table, are dummies (except for *age,* which is measured in years). The variables listed under "characteris-

Table 3.10. *Transitions Out of Unemployment, Classification 2, October 2002–May 2003*

Panel population	All	People without benefits and nonapplicants	People with UA	Applicants	People with UI
Unemployed workers (n), October 2002	3,430	1,919	1,248	207	56
Transitions out of unemployment, absolute values					
To employment (n)	1,036	736	209	68	23
To unemployment (n)	1,722	671	942	85	24
To inactivity (n)	672	512	97	54	9
Transitions out of unemployment (%)					
To employment	30.2	38.4	16.7	32.9	41.1
To unemployment	50.2	35.0	75.5	41.1	42.9
To inactivity	19.6	26.6	7.8	26.1	16.1

Source: Author's elaboration, based on the Permanent Household Survey, October 2002 and May 2003 rounds.
Note: UA = unemployment assistance; UI = unemployment insurance.

Table 3.11. *Statistics Describing the Unemployed Population in the Panel, October 2002*

Variable	Label	Classification 1		Classification 2		Plan Jefes beneficiaries	
		Mean	SD	Mean	SD	Mean	SD
Demographics							
Age	Age, in years	32.9	12.6	33.5	11.9	34.9	10.3
Sex	Sex (1=male)	0.592	0.491	0.484	0.500	0.301	0.459
Rel	Position in the household (1=head)	0.324	0.468	0.355	0.479	0.432	0.496
Civil	Marital status (1=married)	0.297	0.457	0.304	0.460	0.316	0.465
Level of education							
Noeduc	With no education=1	0.007	0.084	0.011	0.105	0.017	0.129
Primary	Primary education=1	0.327	0.469	0.385	0.487	0.494	0.500
Secondary	Secondary education=1	0.466	0.499	0.449	0.497	0.414	0.493
Univ	Tertiary education/university=1	0.199	0.400	0.155	0.362	0.075	0.264
Region of residence							
GBA	Greater Buenos Aires=1	0.144	0.351	0.123	0.328	0.087	0.283
Nwest	Northwest region=1	0.245	0.430	0.261	0.439	0.289	0.454
Neast	Northeast region=1	0.106	0.308	0.144	0.351	0.212	0.409
Cuyo	Cuyo region=1	0.072	0.258	0.071	0.256	0.067	0.251
Pampa	Pampa region=1	0.280	0.449	0.268	0.443	0.244	0.430
Patagonia	Patagonia region=1	0.153	0.360	0.134	0.341	0.100	0.301
Characteristics of the last occupation							
Exper	Working experience (1=yes)	0.821	0.383	n.a.	n.a.	n.a.	n.a.
Last_self	Last occupation self-employment (1=yes)	0.210	0.407	n.a.	n.a.	n.a.	n.a.
Last_sal	Last occupation salaried position (1=yes)	0.604	0.489	n.a.	n.a.	n.a.	n.a.
Benefit-related variables							
UI_beneficiary	Insured unemployment (1=yes)	0.025	0.157	0.016	0.127	0.000	0.000
UA_beneficiary	Beneficiary of Plan Jefes (1=yes)	0.021	0.142	0.364	0.481	1.000	0.000
UA_applicant	Applicant for Plan Jefes (1=yes)	0.093	0.290	0.060	0.238	0.000	0.000
Observations (n)		2,228		3,430		1,304	

Source: Author's elaboration, based on the Permanent Household Survey, October 2002 and May 2003 rounds.
Note: n.a. = not applicable; SD = standard deviation.

tics of the last occupation" apply only to individuals reporting unemployment. Consequently, they are not measured for classification 2.

On average, compared with nonparticipants, the group of participants displayed a slightly higher age, higher share of females, higher incidence of household heads, and lower levels of education. Regionally, they were relatively more concentrated in northern regions.

Model Specification and Results

The impact of unemployment compensation on the risk of unemployment was analyzed by sequentially considering the two classifications. The regressions focused on individuals who were unemployed in the first period and were active in the second period. Transitions to inactivity were not modeled in the regressions.

Binary logit models were used to analyze transitions, and both the KM estimator and Cox models were used to estimate duration, according to the methods described previously in this report.

The results of the logit and Cox models for both classification scenarios are presented first. Nonparametric analysis closes the comparison.

Classification 1

Logit Model. The specification for the logit model is

$$P_i = E(Y = 1 \mid X_i) = \frac{1}{1 + e^{-(\beta_i X_i)}}, \tag{3.11}$$

where the probability of transitioning from unemployment to employment P_i is a logistic function of individual characteristics X_i, including access to benefits, demographic variables, educational level, region of residence, and characteristics of the last occupation.

The dependent variable takes on the value 1 if the individual transitioned from unemployment to employment, and it takes on the value of 0 if the person remained unemployed.

Benefit-related effects were modeled with UA and UI variables. UA entered in the form of two dummy variables, each indicating the condition of beneficiary or the condition of applicant.

Given the evidence found in other studies discussed previously in this report, one should expect the variable *UA_beneficiary* to be associated with a negative coefficient, thus reflecting UA's disincentive effects on the transitions to employment. In the first classification, however, the bulk of recipients are, by definition, transitioned into employment. This job-search behavior probably is associated with a need for greater income. We can expect these people to experience a positive impact of UA on the hazard to employment.

The dummy variable specifying the condition of applicant (*UA_applicant*) is a characteristic of our data set. The precedents for using this variable are scarce.[16] Assuming that the expectation of a benefit reduces the job-seeking effort, one would expect this characteristic to have the same impact as does the condition of being a UA beneficiary.

UI enters as a dummy variable that indicates whether the unemployed worker is receiving such insurance. A negative sign associated with the disincentive effects of UI is foreseen.

Other regressors include sex, age in years, household head and marital status, level of education, region of residence, and characteristics of the last occupation (work experience and last occupational category). Although the effect of those variables cannot be fully predicted, one can propose some generalizations. According to sociologic theory, individuals within a household

---

16. Ravallion used the difference-in-difference method on data gathered in the May and October 2002 rounds of the Permanent Household Survey to estimate the impact of Plan Jefes on different labor market outcomes. The group of applicants enters as the comparison group.

differ in terms of their relative responsibilities as income providers. Males, adults, household heads, and relatively educated people are considered *primary workers,* under the assumption that they are more likely to participate in generating family income. Conversely, women, young people, those who are not heads of households, and less-educated people are considered *secondary workers* (Paz 2003).

Studies on transitions to employment in Argentina usually find gender differentials favorable to male workers that are explained by the difficulty that women face in exiting unemployment (Ortega 2006). Accordingly, one can expect a positive sign for the variable *sex,* reflecting males' relative advantage in transitioning to employment. The age of the individual is expected to be negatively associated with the probability of employment. The tendency to hire younger workers (that is, the age discrimination effect) is explained by the training costs that firms face for every worker hired. By hiring young workers, firms maximize their recovery of costs (Ehrenberg and Smith 1994). Household heads and married people should have greater likelihood of making transitions to employment because of their roles as income providers.

Level of education is a key variable in determining employment outcomes. Empirical studies have pointed out that the relationship between level of education and employment takes the form of an inverted U (Ramos 2002), linking higher probabilities of employment to middle and upper-middle levels of education. One should expect that the level of education in the present study will be associated positively with the probability of exiting unemployment.

Regional variables should capture the relative conditions of regional labor markets. Greater Buenos Aires and Patagonia regions generally display better labor conditions, whereas the northeast and northwest regions of Argentina are relatively poorer. Workers residing in those latter regions can be expected to show a worse employment performance in the present study.

Characteristics of the last occupation affect the probability of employment in several ways. Compared with first-time job seekers, unemployed people with work experience are expected to display greater likelihood of employment, and that predicts a positive coefficient for the variable in the present study. The human capital that workers accumulate in jobs explains their relative advantage in competing for a job against workers without experience.

Finally, the effects derived from the last occupational category (self-employment or salaried) are difficult to predict and probably will be related to the conditions of the labor market.

The results of the logit regression are presented in table 3.12. The coefficients in the "marginal effects" section of the table report the percentage change in the probability of moving from unemployment to employment, given a unitary change in the value of the regressor (Gujarati 2003). A positive (negative) sign indicates that the probability is higher (lower) for individuals with higher values of that variable. Because all the variables are dichotomous (except *age,* which is presented in years), the results indicate a change of the probability in the presence of the attribute.

Cox Model. The following equation provides an adequate functional form to estimate the Cox model:

$$\gamma_i(t) = \lambda_0(t) \exp(z_i(t)'\beta). \tag{3.12}$$

The survival setting comprises the survival time variable, containing the duration of the unemployment periods in months, and an endpoint variable, defined to take on the value 1 when the period is complete (that is, when the individual has moved to employment) and 0 if the period is ongoing and the observation is censored.

With the information reported in the survey, it is possible to compute the duration of unemployment periods by applying these two expressions:

- duration of unemployment, completed periods = time of search declared in period 1 + time between surveys (six months) – duration of current job declared in period 2, and
- duration of unemployment, ongoing periods = time of search declared in period 2.

Table 3.12. *Unemployment Compensation and Unemployment Risk, Classification 1*

Regressor	Probability of transitioning from unemployment to employment				Duration of unemployment	
	Logit		Marginal effects		Cox	
	Coefficient	SE	Coefficient	SE	Coefficient	SE
Age	–0.01910	0.00584***	–0.0046892	0.00143***	–0.03265	0.00535***
Sex	–0.01441	0.11696	–0.0035356	0.02870	0.05240	0.09921
Position in the household	0.39360	0.13873***	0.0956979	0.03328***	0.42480	0.12197***
Marital status	0.25493	0.13132*	0.0620603	0.03164*	0.26321	0.11720**
Primary education	–0.18650	0.63603	–0.0459269	0.15696	–0.29505	0.40824
Secondary education	–0.55722	0.63892	–0.136346	0.15483	–0.71434	0.40874
Tertiary education	–0.21763	0.64578	–0.0538029	0.16043	–0.43847	0.41636
Northwest region	0.04129	0.16965	0.0101229	0.04152	0.39251	0.14848***
Northeast region	0.46509	0.21901**	0.1099467	0.04919***	0.60573	0.17534***
Cuyo region	0.08671	0.23181	0.0211722	0.05627	0.19590	0.23468
Pampa region	–0.01301	0.16223	–0.0031959	0.03986	–0.00707	0.13843
Patagonia region	0.30772	0.18389*	0.0741772	0.04332	0.68223	0.14901***
Working experience	0.36924	0.15698**	0.0916176	0.03908***	0.46511	0.13386**
Last_self-employed	0.36620	0.13202***	0.088339	0.03113***	0.49901	0.11982
UI_beneficiary (1=yes)	–0.22455	0.31015	–0.055705	0.07745	–0.00865	0.25076
UA_beneficiary (1=yes)	0.83985	0.39900**	0.1861185	0.07555***	0.70968	0.25130***
UA_applicant (1=yes)	0.26363	0.18648	0.0635312	0.04392	0.16503	0.14836
Constant	0.50619	0.69481	n.a.	n.a.	n.a.	n.a.
Observations (n)	1,625		1,625		1,169	
Log likelihood	–1074.3		n.a.		–3177.0	

Source: Author's calculations.
Note: n.a. = not applicable; SE = standard error.
* Significant at 10%.
** Significant at 5%.
*** Significant at 1%.

Compensation-related variables enter as described for the logit model, as do the rest of the explanatory variables.

Because of the relationship between unemployment and duration, it is expected that variables that favor (harm) the transition to employment also shorten (lengthen) the duration of the unemployment period. It is expected that the coefficients in the Cox specification will have the same signs as they do in the logit specification.

Table 3.12 presents the results of the Cox model. The coefficients report the percentage change in the hazard to employment, or the risk of exiting from unemployment to employment, given a change in the value of the regressor. A positive (negative) sign indicates that the hazard is higher (lower), and thus the duration of the unemployment period is shorter (longer) for individuals with higher values of that variable (Walters 2000). For dummy variables, the coefficients report the shift in the baseline, given the presence of the attribute. A statistically insignificant result means that changes in the variable do not shift the baseline hazard function.[17]

---

17. After Cox regressions of the form $\lambda_i(t) = \lambda_0(t) \exp(z_i(t)'\beta)$, using Stata software provides the hazard ratio $\lambda_i(t) / \lambda_0(t) = \exp(z_i(t)'\beta)$. When reporting results, these coefficients are transformed by the log function, which means that the coefficients account for elasticities. Given the nature of the regressors in the present study, it is more proper to interpret the coefficients in terms of percentage change. For dummy variables, the possible outcomes are $\lambda_i(t) / \lambda_0(t) = \exp(0) = 1$ in the absence of the attribute, and $\lambda_i(t) / \lambda_0(t) = \exp(\beta)$ when the attribute is present (which, by comparison, represents the shift of the baseline hazard). Equally, a coefficient not statistically different from 0 implies that $\lambda_i(t) / \lambda_0(t) = \exp(0) = 1$ and $\lambda_i(t) = \lambda_0(t)$.

CLASSIFICATION 1 RESULTS. Table 3.12 also presents the results of the estimations for logit and Cox models of classification 1. The analysis of benefit-related variables shows that Plan Jefes beneficiaries, compared with nonassisted workers, experience a lower risk of unemployment. This assumes the form of a higher probability of transitioning to employment (19 percent) and a higher hazard (71 percent), meaning that beneficiaries face shorter periods of unemployment. The dummy for UA is significant in both models, and it displays the results that may be expected in classification 1.

Having applied for UA produces the same results, although with lower significance. Applicants display better probabilities of employment. This finding mirrors the fact that part of the applicants became beneficiaries in the second period and, hence, were classified as employed.

UI is not significant enough to explain the risk of unemployment. However, it negatively affects both logit and Cox models, which suggests the presence of disincentive effects associated with the insurance.

The characteristics of the last occupation are generally significant enough to explain the exits from unemployment. Unemployed people who have work experience display better job-gaining performance than do first-time job seekers. This finding is explained by the behavior of unemployed workers coming from self-employment positions and not by unemployed workers previously engaged in other occupational categories.

Increased age is associated with a worsening in the prospects for employment. Conversely, household heads or married workers experience a lower risk of unemployment according to consistent findings obtained for the logit and Cox models. These results are typical in labor market analysis and are in agreement with theoretical considerations already discussed.

Only residents of the northeastern region of Argentina display chances of being employed in a second period that are superior to the chances of the unemployed workers in Greater Buenos Aires. Likewise, the length of unemployment periods is shorter in three of the five regions studied: northwest, northeast, and Patagonia.

Finally, the study revealed an atypical result: sex and education level are not adequately significant to explain the transitions or the hazards under analysis.

In sum, between October 2002 and May 2003, job creation favored unemployed workers receiving or applying for UA; household heads; married individuals; unemployed workers coming from self-employed positions; and residents from the northeast, northwest, and Patagonia regions. The probabilities of exiting unemployment were significantly lower for older workers.

To interpret these results, one should start by recalling that the beneficiaries included in this regression are those who reported being unemployed, although they were enrolled in Plan Jefes. Most of them had transitioned to employment by the second period of the study, and that explains the positive impact of the variable on the regressions. The same behavior is found among the assistance applicants.

Receiving assistance turns out to be a key variable in explaining the lower risk of unemployment because its influence can be recognized in other equally significant regressors. Looking at the descriptive statistics, one can see that 43 percent of Plan Jefes beneficiaries are heads of household, whereas that is true for only 32 percent of the total sample. A similar interpretation can be made for the regional analysis. With the exception of Patagonia, the share of plan participants living in regions where the prospects for employment are higher is relatively greater than the average for the total sample.

The low significance of gender and education in logit and Cox models also is related to imbalances in the distributions of these variables between plan participants and the total sample. The presence of women in the group of beneficiaries is 70 percent, against 40 percent for the total sample of unemployed people. Beneficiaries also display lower levels of education: more than 50 percent of them managed to complete, at most, only the primary level.

Because of the manner in which variables are constructed, it is not possible to make a direct interpretation of UA's disincentive effects on employment performance. In any case, it is likely

that UA produced an incentive effect, as is apparent for the partial coefficient of the variable in both logit and Cox regressions.

With regard to UI, although its impact is negative, the low level of significance does not permit attributing disincentive effects derived from its application.

Given the results obtained in this study in the classification 1 scenario, UI and UA do not introduce disincentive effects in job-search efforts.

Classification 2

The analysis in the classification 2 scenario was performed on 2,758 cases, 1,036 of which made a positive transition to employment and 1,722 remained unemployed in May 2003 (see table 3.10). In this second scenario, most Plan Jefes participants are unemployed, and UA is treated as any other attribute. The disincentive effects associated with such compensation are expected to appear in this model.

The specification of the logit model is the same as it was in the classification 1 scenario. Because beneficiaries are computed as employed in the survey, the descriptors for the last occupation do not apply, and the corresponding regressors are dropped from the model.

In the Cox model, the survival setting was constructed as it was in the classification 1 analysis. In this case, however, it is not possible to calculate the length of unemployment from the information gathered in the survey. Therefore, it was necessary to impute a period of unemployment to assisted workers. Assuming that beneficiaries are unemployed even when working for Plan Jefes, their unemployment lasts at least the number of months that has passed since they enrolled in the plan. The periods computed accordingly would range between 0 and 12 months because the program began in May 2002 and the final observation in our study occurred in May 2003. Although this method is useful as an approach, it conceals part of workers' labor paths because it does not take into account the period of unemployment that beneficiaries registered when they enrolled. That period must be estimated and added. The household survey in May 2002 gathered information about beneficiaries' occupational situations when the program was launched. The data showed that beneficiaries, on average, had been unemployed for seven months before entering the program. Consequently, the total length of time that beneficiaries were unemployed is corrected by a factor that captures the period of unemployment that preceded their plan enrollment:[18]

- duration of unemployment, completed periods = 7 + time of enrollment declared in period 1 + time between surveys (six months) – duration of current job declared in period 2, and
- duration of unemployment, ongoing periods = 7 + time of enrollment declared in period 2.

The regressors are reduced because of the lack of information about the last occupation. Compensation-related variables, demographics, education level, and region of residence are maintained.

CLASSIFICATION 2 RESULTS. Table 3.13 summarizes the results of the estimations when the restrictive definition of employment is used. The set of regressors is shorter than in the classification 1 scenario because variables associated with the characteristics of last occupation have been dropped from the model.

---

18. The method suggested could be considered arbitrary and surely contains a degree of inaccuracy. It is used because the results obtained are consistent with the evidence in the literature. The studies found that "most of beneficiaries [when enrolled] were affected by long-term unemployment, while 59% of men and 81% of women had been looking actively for a job for more than six months" (Roca et al. 2003, p. 25). In any case, the method that I used was broad because it was based on averages, and it should be interpreted as an approach.

Table 3.13. *Unemployment Compensation and Unemployment Risk, Classification 2*

| Regressor | Probability of transitioning from unemployment to employment | | | | Duration of unemployment | |
| | Logit | | Marginal effects | | Cox | |
	Coefficient	SE	Coefficient	SE	Coefficient	SE
Age	–0.00502	0.00474	–0.00114	0.00108	–0.02494	0.00514***
Sex	0.54640	0.09676***	0.12349	0.02158***	0.42614	0.09775***
Position in the household	0.47934	0.10967***	0.11013	0.02529***	0.51838	0.11674***
Marital status	0.03988	0.10314	0.00909	0.02357	0.10978	0.11446
Primary education	0.25489	0.44878	0.05833	0.10319	–0.24661	0.42320
Secondary education	0.15018	0.45177	0.03424	0.10317	–0.49705	0.42471
Tertiary education	0.51568	0.46066	0.12244	0.11259	–0.17150	0.42967
Northwest region	–0.15421	0.14687	–0.03467	0.03261	0.11070	0.14864
Northeast region	0.01361	0.17018	0.00310	0.03882	0.23272	0.17535
Cuyo region	–0.17713	0.20143	–0.03931	0.04352	–0.01533	0.23432
Pampa region	–0.00261	0.14264	–0.00059	0.03243	–0.01502	0.13740
Patagonia region	0.25874	0.16127	0.06034	0.03843	0.51362	0.14755***
UI_beneficiary (1=yes)	–0.37032	0.30679	–0.07913	0.06093	–0.08794	0.25494
UA_beneficiary (1=yes)	–1.44704	0.10560***	–0.30801	0.01998***	–2.02543	0.14535***
UA_applicant (1=yes)	–0.24374	0.17839	–0.05348	0.03762	–0.29232	0.17822
Constant	–0.53575	0.50080	n.a.	n.a.	n.a.	n.a.
Observations (n)	2,758		2,758		2,184	
Log likelihood	–1605.9		n.a.		–3494.9	

Source: Author's calculations.
Note: n.a. = not applicable; SE = standard error.
* Significant at 10%.
** Significant at 5%.
*** Significant at 1%.

As expected, results in the second scenario differ from those in the first scenario. The general loss of significance of the explanatory variables is remarkable. The variables that significantly predict the risk of unemployment are sex, status as head of household, and assistance recipiency. In addition, age and the dummy for the Patagonia region predict the hazard.

Benefit-related variables indicate that the risk of unemployment significantly increases for Plan Jefes participants. Compared with nonassisted workers, the probability of transitioning to employment is 31 percentage points lower, and the hazard rate is more than two times lower among the assisted.

Although insurance and applicant status are not significant enough to explain the results, they are negatively associated with transitions to employment. Insurance reduces the probability of employment and the hazard indicating the existence of disincentive effects associated with the benefit. The condition of applicant also negatively affects the move to employment in both the logit and Cox models. As before, this result reflects the fact that part of the applicants became beneficiaries (hence, unemployed) in this model.

The variable *age* does not predict the probability of transitioning to employment, but it significantly reduces the hazard to employment and produces longer periods of unemployment. For every increase in the level of the regressor equal to one standard error, the hazard decreases 28 percent.

The variable *sex* acquires the significance to explain the results, and it shows that the risk of unemployment is lower for male workers than for females. These results are consistent with theoretical considerations and represent a major difference from the classification 1 scenario.

Status as head of household is significant and has the same impact as it did in the previous model and as expected on the basis of the evidence. In this case, the results cannot be related to assistance recipiency. This is a genuine result attributable to the behavior of household heads.

The regional analysis shows that workers from Patagonia display a higher hazard than do unemployed workers from Greater Buenos Aires. AS noted in the classification 1 analysis, this region is the only one in which the number of Plan Jefes beneficiaries is lower than the national average.

Finally, once again the level of education is not significant.

In sum, for the classification 2 scenario, the creation of work during the period favored male workers and household heads, and relatively young workers and residents of Patagonia had shorter periods of unemployment. The risk of unemployment increased significantly, however, for individuals enrolled in the assistance program. The disincentive effects of UA are exposed in these regressions. When the definition of employment is restricted to nonassisted modalities, the disincentive effects on the search effort explain the worsening of the possibility of obtaining employment.

Duration of Unemployment Periods under Alternative Classifications

To this point, unemployment duration has been reported in terms of percentage changes in hazard rates to employment. That is the standard manner for reporting the results, and it allows the measurement of elasticities associated with determinate regressors.

Deriving the length of unemployment periods from Cox models is complex because the process involves estimating the baseline hazard. Nonparametric analysis, operationalized with the KM estimator, represents an alternative way to deal with the duration of unemployment periods. Although KM is a descriptive instrument in which individual characteristics are not accounted for, the comparison is still possible.

There are several methods for comparing survival curves. For the objectives of the present analysis, the elements provided by the survival functions and the life table (Walters 2000) will suffice. Figure 3.1 displays the survival function for the unemployed workers, grouped by classification. Table 3.14 presents percentile measures of the moves from unemployment to jobs.

The longer duration of unemployment in the second case is clear from the figure and the data in the table. In classification 1, 25 percent of the periods of unemployment last up to six months, 50 percent last up to 13 months, and 75 percent last up to 29 months. The mean of the distribution is 8.7 months. In classification 2, the periods of unemployment increase in length, which is evident in a more slowly decreasing survival curve that, in turn, follows from the relatively longer duration of unemployment in the second group. The percentile distribution is read in the same way as before, and the mean of the distribution is 10.4 months.

Figure 3.1. *Kaplan-Meier Survival Estimates, by Classification*
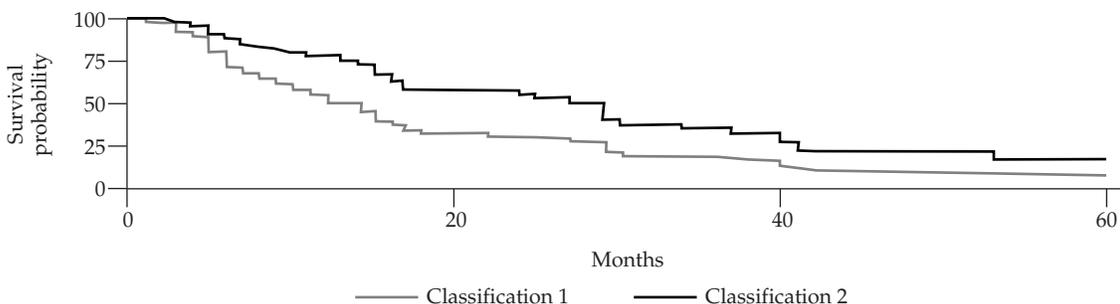
Source: Author's calculations.
Note: The graph displays the curves for a period of 60 months.

Table 3.14. *Percentile Distribution of Exits from Unemployment, by Classification, May 2003*

Classification	Sample size[a]	25%	SE	50%	SE	75%	SE
1	1,169	6	0.1095104	13	0.2604754	29	2.077554
2	2,184	14	0.4526873	28	0.9120105	41	3.094940

Source: Author's calculations.

Note: SE = standard error.

a. The original numbers of observations (1,625 in classification 1; 2,758 in classification 2) were reduced as a result of inconsistencies discovered when computing the periods of unemployment.

Nonparametric analysis indicates that, when employment is broadly computed, the average period of unemployment lasts 8.7 months; when it is restrictively defined, the average is 10.4 months. The average difference of 1.7 months is attributable to the differences in the definition of employment.

Conclusion

Using panel data from Argentine households collected in October 2002 and May 2003, this report has evaluated the influence of UI and UA (Plan Jefes) on the risk of unemployment for the purpose of identifying the presence of disincentive effects associated with such benefits.

The hypothesis that unemployment compensation increases the risk of unemployment has been studied extensively in the literature. However, a systematic study of the effects of the compensation on the incidence and duration of unemployment in Argentina has not been undertaken.

Following the literature on compensation analysis, binary logit models were used to estimate the probability of transition from unemployment to employment, and Cox proportional hazards models were used to estimate the duration of unemployment. The KM estimator also was computed for a nonparametric analysis of the events.

To address the specifics of the Argentine case, the analysis was performed for two different scenarios, termed classifications 1 and 2. The first classification was based on a broad definition of employment that treated those people receiving UA as employed, whereas the second classification was based on a restrictive definition of employment that did not treat assistance recipients as employed. Given the magnitude of Plan Jefes, the size of the flows across labor market status changes considerably from one scenario to the other.

This study found that, for the first classification, UA appears to be an efficient instrument that favors reinserting unemployed workers into jobs and does not introduce disincentive effects. Results of the logit and Cox models consistently showed that both assistance participants and applicants exhibit higher probabilities of transitioning to employment and shorter periods of unemployment that follow from their higher hazards to employment. However, these results also capture the behavior of a small part of the participants.

In the second classification, there is evidence of demotivating effects associated with the use of the assistance program. According to logit and Cox models, unemployed workers who receive assistance have a lower probability of moving into employment and lower hazards to employment that translate into longer periods of unemployment.

The use of UI was not found to affect the employment behavior of participating workers. That result is similar in both classifications under analysis and follows from the low significance that the variable exhibited in logit and Cox models. This finding suggests that there are no disincentive effects associated with the use of UI. Nevertheless, as was pointed out in the text, UI has limited coverage and only formal workers have access to it.

From the discussion about the distinction between the two classifications of employment, the relevance of applying a definition of employment toward which the policy efforts can be ad-

dressed is evident. Ideally, the definition should be in agreement with society's expectations about employment.

Finally, policy instruments should be reviewed in accordance with the objectives for which they are created, particularly distinguishing between employment creation and other forms of social protection. The aim of labor policy should be the design of instruments to replace the assisted forms of employment with regular jobs.

References

Adamchick, V. 1999. "The Effects of Unemployment Benefits on the Probability of Re-employment in Poland." *Oxford Bulletin of Economics and Statistics* 61 (1): 95–108.

Arranz, J. M., and J. Muro. 2004. "An Extra Time Duration Model with Application to Unemployment Duration Under Benefits in Spain." *Revista de Economía Pública* 171 (4): 133–56.

Atkinson, A., and J. Micklewright. 1991. "Unemployment Compensation and Labor Market Transitions: A Critical Review." *Journal of Economic Literature* 29 (4): 1679–727.

Beccaria, L. 2001. "Algunas Propuestas de Políticas Laborales." Photocopy. Woodrow Wilson International Center for Scholars, Washington, DC. http://www.wilsoncenter.org.

Bertranou, F., and D. Bonari. 2005. "Protección Social en Argentina. Financiamiento, Cobertura y Desempeño." Photocopy. International Labour Organization, Geneva, Switzerland.

Calmfors, L., and B. Holmlund. 2000. "Unemployment and Economic Growth: A Partial Survey." *Swedish Economic Policy Review* 7: 107–53.

Cerimedo, F. 2004. "Duración del Desempleo y Ciclo Económico en la Argentina." Working Paper 53, Universidad Nacional de La Plata, Argentina.

Ehrenberg, R., and R. Smith. 1994. *Modern Labor Economics: Theory and Public Policy.* New York: Harper-Collins.

Galasso, E., and M. Ravallion. 2003. "Social Protection in a Crisis: Argentina's Plan Jefas y Jefes." Policy Research Working Paper 3165, World Bank, Washington, DC.

Galiani, S., and H. Hopenhayn. 2001. "Duration and Risk of Unemployment in Argentina." Paper presented at the Institute of Business and Economic Research, Center for International and Development Economics Research, University of California, Berkeley.

Greene, W. H. 2002. *Econometric Analysis,* 5th ed. Upper Saddle River, NJ: Prentice Hall.

Gujarati, D. N. 2003. *Basic Econometrics.* New York: McGraw-Hill.

INDEC (Instituto Nacional de Estadística y Censos). 2002. "Mercado de Trabajo: Principales Indicadores de Aglomerados Urbanos. Información de Prensa." Buenos Aires, Argentina.

INEI (Instituto Nacional de Estadística e Información). 2000. "Dinámica del desempleo." Lima, Peru.

Kaplan, E. 1983. "This Week's Citation Classic." http://www.garfield.library.upenn.edu/classics1983/A1983QS51100001.pdf.

Karni, E. 1999. "Optimal Unemployment Insurance: A Guide to the Literature." Social Protection Discussion Paper 9906, World Bank, Washington, DC.

Katz, L., and B. Meyer. 1988. "The Impact of the Potential Duration of Unemployment Benefits on the Duration of Unemployment." Working Paper 2741, National Bureau of Economic Research, Cambridge, MA.

Kuhn, P., and C. Riddell. 2006. "The Long-Term Effects of a Generous Income Support Program: Unemployment Insurance in New Brunswick and Maine, 1940–1991." Working Paper 11932, National Bureau of Economic Research, Cambridge, MA.

Lancaster, T. 1979. "Econometric Methods for the Duration of Unemployment." *Econometrica* 47: 939–56.

Layard, R., S. Nickell, and R. Jackman. 1991. *Unemployment: Macroeconomic Performance and the Labour Market.* Oxford, UK: Oxford University Press.

MECON (Ministerio de Economía y Producción). 2003. "Efectos de los Planes Jefes y Jefas sobre el Empleo." Paper prepared by Dirección Nacional de Coordinación de Políticas Macroeconómicas, Buenos Aires, Argentina. http://www.mecon.gov.ar/peconomica/docs/planes_jefesyjefas.pdf.

Meyer, B. 1988. "Unemployment Insurance and Unemployment Spells." Working Paper 2546, National Bureau of Economic Research, Cambridge, MA.

———. 1995. "Semiparametric Estimation of Hazard Models." Department of Economics and Center for Urban Affairs and Policy Research, Northwestern University, Chicago.

Micklewright, J., and G. Nagy. 1998. "Unemployment Assistance in Hungary." *Empirical Economics* 23: 155–75.

Módolo, C. 2004. "Los Peligros Institucionales del Plan Jefas y Jefes de Hogar." Paper presented at the Novenas Jornadas "Investigaciones en la Facultad" de Ciencias Económicas y Estadística, November.

Mortensen, D. 1986. "Job Search and Labor Market Analysis." In *Handbook of Labor Economics,* ed. O. Ashenfelter and R. Layard, 849–97. Philadelphia: Elsevier.

MTESS (Ministerio de Trabajo, Empleo, y Seguirdad Social). 2002. "Impacto Macroeconómico del Programa Jefas y Jefes de Hogar." Dirección General de Estudios y Formulación de Política de Empleo, Buenos Aires, Argentina.

OECD (Organisation for Economic Co-operation and Development). 1991. *OECD Employment Outlook.* Paris.

Ortega Masagué, A. 2006. "El Diferencial entre las Tasas de Desempleo de Hombres y Mujeres en Argentina." Working Paper 2006-08, Fundación de Estudios de Economía Aplicada, Madrid. http://www.fedea.es/pub/Papers/2006/dt2006-08.pdf.

Paserman, D. 2004. "Bayesian Inference for Duration Data with Unobserved and Unknown Heterogeneity: Monte Carlo Evidence and Application." Paper presented at Hebrew University, CEPR, and IZA.

Paz, J. 2003. "Transiciones en el Mercado de Trabajo y Protección Laboral en la Argentina (Estudio Basado en Datos de la Encuesta Permanente de Hogares, 1997–2002)." Paper presented at Seminario-Taller, "Historias Laborales y Frecuencias de Aportes al Sistema de Seguridad Social," Buenos Aires, Argentina, March 20.

Pellegrini, J., C. Badler, S. Alsina, C. Puigsubirá, and S. Vitelleschi. 2003. "Corrección de la Incidencia de los Planes Jefas y Jefes de Hogar Desocupados sobre los Principales Indicadores Laborales." Paper presented at the 38th Annual Meeting of Asociación Argentina de Economía Política, Mendoza, Argentina, November 12–14.

Pok, C., and A. Lorenzetti. 2004. "Los Perfiles Socials de la Informalidad en Argentina." Paper presented at Centro Interdisciplinario para el Estudio de Políticas Públicas, Buenos Aires, Argentina, May 28.

Pollmann-Schult, M., and F. Buchel. 2005. "Unemployment Benefits, Unemployment Duration and Subsequent Job Quality. Evidence from West Germany." *Acta Sociologica* 48: 21–39.

Ramos, A. 2002. "Informe sobre o Mercado de Trabalho na República Federativa do Brazil." http://www.observatorio.net.

Roca, E., B. Capelletti, M. Langieri, M. Muscolino, and C. Soto. 2003. "Plan Jefas y Jefes de Hogar Desocupados: Política de Empleo o Política Social?" Paper presented at Asociación Argentina de Especialistas en Estudios del Trabajo, Buenos Aires, Argentina, August 13–16.

Tzannatos, Z., and S. Roddis. 1998. "Unemployment Benefits." Social Protection Discussion Paper 9813, World Bank, Washington, DC.

Van Opstal, R., and J. Theeuwes. 1986. "Duration of Unemployment in the Dutch Youth Labor Market." *De Economist* 134 (3): 351–67.

Vodopivec, M. 2004a. "Comparing Unemployment Insurance and Unemployment Assistance." *World Bank Employment Policy Primer* 3 (February). http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTSOCIALPROTECTION/EXTLM/0,,contentMDK:20295084~menuPK:584861~pagePK:148956~piPK:216618~theSitePK:390615,00.html.

———. 2004b. "Unemployment Insurance: Efficiency Effects and Lessons for Developing Countries." *World Bank Employment Policy Primer* 5 (April). http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTSOCIALPROTECTION/EXTLM/0,,contentMDK:20295078~menuPK:584861~pagePK:148956~piPK:216618~theSitePK:390615,00.html.

Walters, S. 2000. "What Is a Cox Model?" http://www.evidence-based-medicine.co.uk/ebmfiles/WhatisCoxModel.pdf.

4

Distributional Implications of Power Sector Reforms in the Philippines

Wondielyn Q. Manalo-Macua

This report assesses the distributional implications of Philippine power sector reforms for residential consumers of electricity. We first estimate the demand for electricity, taking into consideration the difficulties produced by the block pricing of electricity. We then simulate the impact of power reforms in terms of increased electricity prices, assuming a linear budget set and using the elasticities from the demand equation. That exercise draws heavily on the duality in consumer theory that enables us to recover the utility function of individuals and to assess welfare in terms of compensating variation. This report states that an increase in the price of electricity will result in higher welfare losses as household income increases. Among the poorest households, however, the welfare loss is greatest among the lower-income groups.

Power sector restructuring has been the centerpiece of Philippine reform policy in the years 2001 through 2007. Following successful privatization of the country's telecommunications and water industries and the power sector's vast experience with various privatization programs (such as the build-operate-transfer scheme), the major restructuring in the sector started in 2001 with the passing of the Electric Power Industry Act.

That legislation began the gut-wrenching reforms in the sector as it dismantled the decades-old monopoly—the National Power Corporation (Napocor)—and sought more private sector participation in the industry. Napocor was spun off into two separate businesses: power generation and power transmission. The generation component was placed under the operational control of Napocor until its complete sale and privatization, and the transmission business was placed under the management of the newly created National Transmission Corporation

(Transco). Transco will be offered to interested private investors under a franchise/concession contract.[1]

The power sector reform has been implemented in the midst of such macroeconomic problems as rising fiscal deficits and an overall ballooning debt burden (see figure 4.1). Given the economic climate, the government is in a very tight position trying to provide continuing subsidies and support to Napocor, as shown in figure 4.2. The government must accomplish this provisioning in the presence of Napocor's steadily declining net income and the corporation's increasing debt stock (figure 4.3). And, as figure 4.4 illustrates, Napocor cannot rely on its internally generated revenues to maintain and upgrade electricity infrastructure and to continue serving its customers. It cannot raise its tariff to a level that makes it profitable; that is, increasing the nominal tariff will not raise the firm's profitability, as measured by the return on rate base from 1998 onward.

---

1. In December 2007, the government successfully bid the franchise/concession to a consortium led by State Grid Corporation of China.

Figure 4.1. *Philippines' Deficit and Total Debt, 1999–2004*
Billions of Philippine pesos
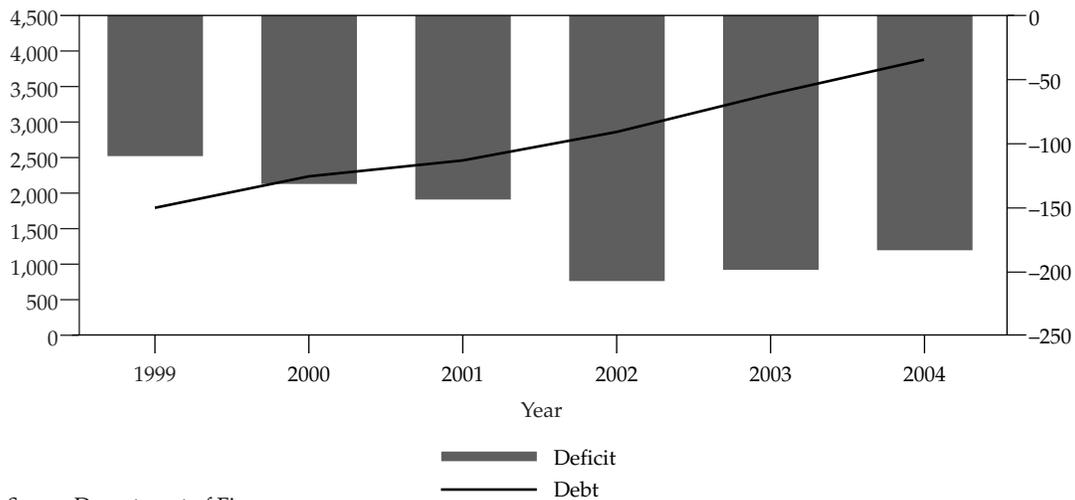
Source: Department of Finance.

Figure 4.2. *National Government's Support to Napocor, 1990–2004*
Billions of Philippine pesos
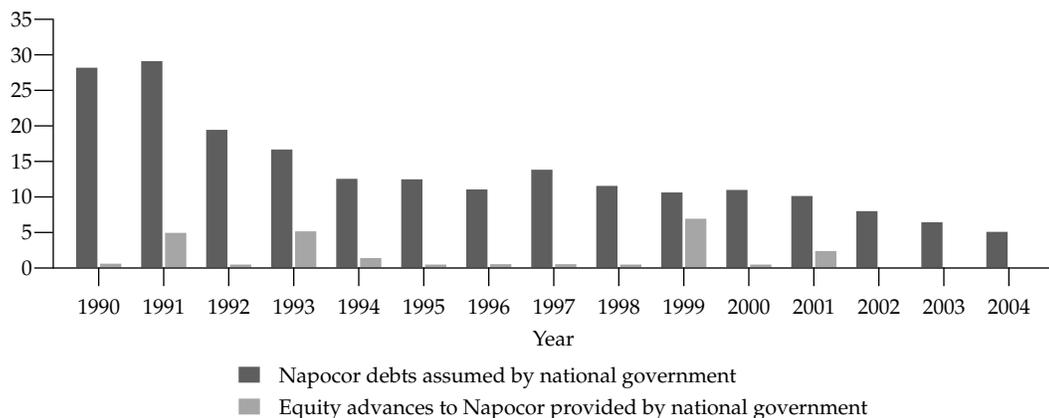
Source: Department of Finance.

Figure 4.3. *Napocor's Net Income vs. Long-Term Debt, 1990–2002*
Billions of Philippine pesos
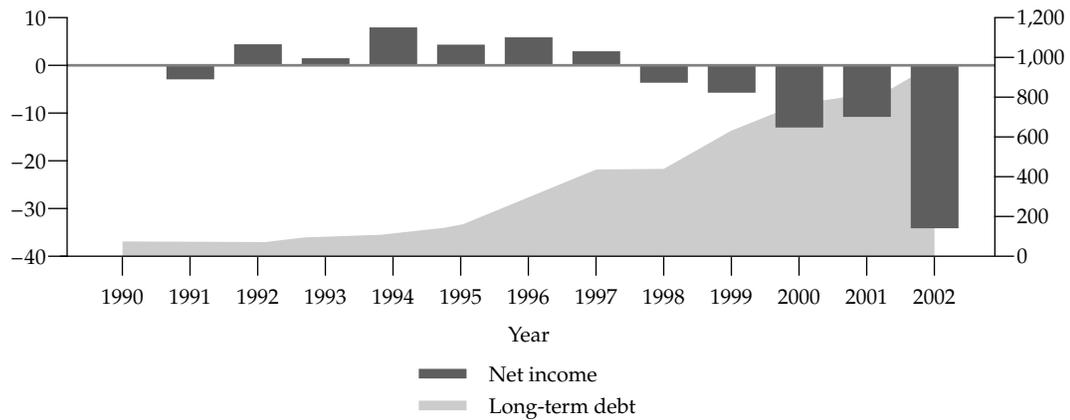
Source: National Power Corporation annual reports.

Figure 4.4. *Napocor's Average Power Rate vs. Return on Rate Base, 1990–2002*
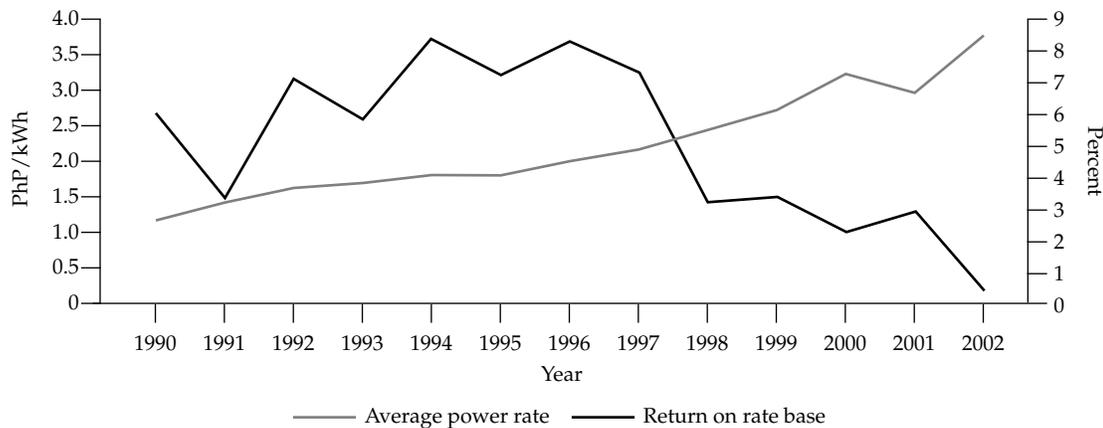
Source: National Power Corporation annual reports.

As the reform seeks to reduce the government support to Napocor and to increase the sector's efficiency as a whole by enabling (1) a more competitive structure for the industry and (2) more private sector participation, the dynamics of gradually removing existing subsidies versus having a more efficient and competitive industry make it difficult to assess the vector of price change. The government maintains that the reforms will prompt price declines, but some sectors believe that prices will go up. Both sides agree, however, that in the presence of reforms, the price of electricity will reflect its true cost so that the competitive structure will work and the private sector will be enticed to invest in the industry.

Given the changes, the impact of reform could be wide and far-ranging. However, its potential impact on consumers is one of the most interesting aspects of the reform because of the government's long involvement in the sector and the history of cross-subsidies among consumer groups—that is, residential, industrial, and commercial consumers.

Because the retail price of electricity has been changing as a result of reforms, there is a growing need to understand its distributional consequences, and those consequences have been the subject of considerable debate. One would expect welfare effects to vary across families, according to how much electricity families consume. Each household's consumption is related to its in-

come and demographic makeup. Thus, to appreciate how consumers react to price changes, we need first to understand the demand for electricity and its relation to price.

This report has two distinct parts. The first part, which estimates the demand for electricity, tries to address the endogeneity and simultaneity problems inherent in residential electricity demand. It also covers our nonrandom sample selection. Our treatment casts these interrelated issues along the lines of Hall (1973) and Heckman (1979). Then we estimate the model using the data from the Family Income and Expenditure Survey (FIES) that includes household characteristics, total expenditures, and spending on electricity. The second part of the report focuses on application. We simulate the impact of an increase in price and assess its distributional implications, using the well-known dual approach to consumer behavior and its use in measuring the costs and benefits of price and other changes. For that exercise, we assume a linear budget constraint, using the observed market demand curve estimated in the first part of the chapter, and then derive the corresponding indirect utility function, the expenditure function, and finally our measure of welfare—the compensating variation.

Estimation of Residential Electricity Demand

Difficulties in Modeling Residential Demand

Among the difficulties that researchers should tackle are endogeneity and simultaneity problems caused by appliance replacement and, to some extent, dwelling decisions.[2] Cowing and McFadden (1984) noted that electricity is not consumed as it is; rather, it is consumed as an input to household processes of climate control, lighting, and provision of other needs. Household technology for electricity consumption, on the other hand, is largely determined by the characteristics of the dwelling and durable equipment. Therefore, the level of electricity consumption is determined by behavioral decisions on use, choice of dwelling, and characteristics of appliances, among other things. Replacement and retrofit decisions, however, depend as well on electricity price expectations.

Second, there is the endogeneity and simultaneity problem that results from the presence of multipart tariffs. In a multipart tariff, the marginal price charged to a consumer changes in a stepwise fashion with the quantity demanded; depending on the context, these tariffs may exhibit increasing or decreasing marginal prices. The challenge in an empirical study is how to incorporate a complex price schedule into a demand specification in a way that is consistent with the economic theory. Taylor (1975) provided a succinct description of the issues in modeling demand for electricity that are caused by multiblock pricing.

In the Philippines, all residential consumers, except those in the National Capital Region, pay a fixed amount for the minimum number of kilowatt hours (kWhs) of electricity consumed. These households then pay a marginal price for additional units consumed. This type of pricing system implies that consumers face a nonlinear (that is, *kinked*) budget constraint similar to that depicted in figure 4.5. The budget line is drawn under the assumption that there are just two goods: electricity, denoted by *X,* and the numéraire good, denoted by *Y.*

Here is the budget line for a kinked budget constraint:

$$\text{at } X = 0, M = Y; \tag{4.1}$$

$$\text{at } 0 < X < x^*\text{; and}$$

$$\text{at } X > x^*, M = F + p\,(X - x^*) + Y.$$

---

2. Although the decision on a dwelling and its relationship with the price of electricity should be the subject of a more detailed study, in the Philippines there is no indication that household dwelling decisions are affected by electricity price. See the regression runs of dwelling characteristics on electricity price presented in table 4A.1 at the end of this chapter.

Figure 4.5. *Budget Constraint with Fixed Payment*
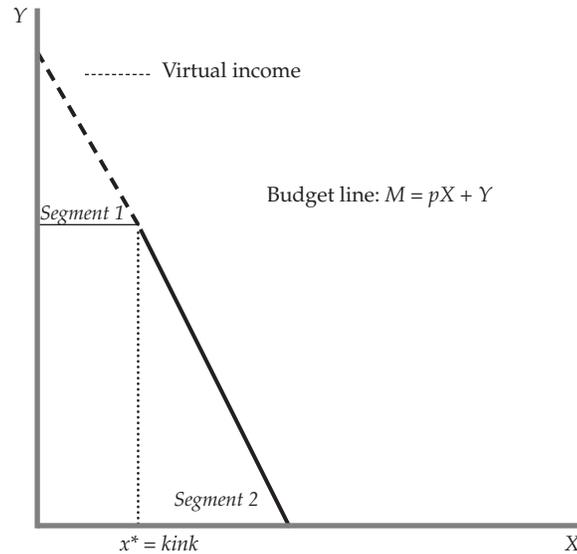
Source: Author's illustration.

Segment 1 is the horizontal segment of the budget constraint equal to the fixed charge, *F.* Segment 2 is the linear segment from the kink; x^* has a slope equal to the price p. Kinked budget constraints create difficulty in estimating demand functions for reasons that are related to economic theory, which assumes that consumers purchase any desired quantity at a constant price, subject to a budget constraint. The standard econometric approach to this problem has its source in Hall (1973): linearize the budget constraint. Doing so requires computing the *virtual income,* which can be seen in figure 4.5 to be the intercept of segment 2 if it is extended to the vertical axis. It is as though households in segment 2 were facing a linear budget constraint with slope equal to the observed price p and intercept m the virtual income.

Here is the formula for computing the virtual income m:

$$M = F + p(X - x^*) + F \qquad (4.2)$$
$$= F + pX - px^* + Y$$
$$M + px^* - F = Y + pX$$
$$m = Y + pX.$$

By computing the virtual income, we can express demand under nonlinear pricing in terms of the ordinary demand function, which assumes a linear budget constraint. However, even if we are able to compute the virtual income, our demand estimation has to consider the problem caused by consumers sorting themselves between the segments—that is, households choosing either (1) to consume less than x^* and pay only the fixed charge F; or (2) to consume above x^* and pay both F and the marginal price p for consumption greater than x^*. This sorting makes calculating demand difficult because we must account for the consumer's willingness to switch tariff segments. This also makes virtual income endogenous because it now becomes a function of price observed only in segment 2.

It is also difficult to assess the demand for electricity among households in segment 1 or those paying only a fixed amount for electricity. We are constrained to use these observations in our regression, which leads to another problem—*nonrandom sample selection.*

To address these difficulties in estimating the demand for electricity, we have implemented a three-step estimation procedure (discussed in detail below) based on previous approaches to modeling demand for electricity and estimating demand for nonlinear budget sets.

Approaches to Modeling Demand

A number of studies on electricity demand have tried to present a detailed description of residential energy consumption, albeit using different approaches. Houthakker's (1951) study of residential electricity consumption in the United Kingdom is considered one of the pioneering studies on energy demand. It is pioneering in many respects. It is one of the earliest studies on demand to take into account the econometric implications of a two-part tariff by using marginal rather than average price, and to consider the cross-price or substitution effect of natural gas on electricity demand.

The work of Fisher and Kaysen (1962), on the other hand, is considered the most ambitious of early dynamic studies of residential energy demand. Those investigators distinguished between short-run and long-run electricity demand. In the short run, they estimated electricity consumption as a function of stock and average utilization of electricity, using household appliances. In contrast, they estimated long-run consumption for five different classes of electric appliances—washing machines, refrigerators, irons, ranges, and water heaters. Their results indicated that income and population were among the important determinants of long-run residential demand.

In a literature survey of electricity demand studies, however, Taylor (1975) lamented the fact that the research on residential electricity demand fails to deal adequately with block pricing. He suggested that regressors should include *both* the marginal price and the average price—the latter to account for the income effect arising from the differential between marginal and intramarginal prices. Since the time of Taylor's literature review, various demand studies have tried to address the issue of nonlinear pricing. Some of those studies have had strong influence from the literature on labor supply that also tried to address closely related issues. Labor supply has been difficult to estimate because of the presence of a nonlinear tax schedule and the fact that individuals have different tastes for reasons that cannot be controlled using observable information. Thus, demand studies increasingly have employed virtual income, instrumental variable, and two-stage least squares approaches as well as sample selection models—all of which previously appeared in labor supply studies.

Hausman, Kinnucan, and McFadden (1979) analyzed the results of the pricing test that attempts to estimate the effect of household electricity demand on time-of-day pricing. They took the appliance stock as fixed so that the medium- and long-run responses cannot be inferred from the analysis. Their approach used traditional econometric consumer demand estimation and treated electricity demand within a two-stage budgetary context. They let electricity demand in each period be a different commodity, and then estimated the relative household demand across periods, conditional on relative prices, the appliance stock, socioeconomic characteristics of households, and the weather. They then applied two-stage least squares to specify how the price of electricity was entered into the demand equations. They linearized the budget set, that is, virtual income at a reduced form prediction on monthly consumption. They used predicted quantities and the rate schedule to form the predicted price variable, which served as an instrumental variable for the observed marginal price in the second-stage ordinary least squares (OLS) estimation of the demand equation. Their analysis exhibited biases opposite in sign to those of their OLS counterparts.

Reiss and White (2004) studied electricity demand from a sample of California households, trying to develop an estimable model that could be used to evaluate alternative tariff designs. They assumed that the demand for electricity is derived from the flow of services provided by a household's durable energy-using appliances, and they made a distinction between short-run and long-run demand elasticities. The short-run elasticities referred to demand behavior, taking a household's existing appliance stock as given; the long-run elasticities were meant to incorporate both changes in utilization behavior and any adjustments to the stock of appliances owned by the household. Their approach to modeling electricity demand conditioned econometric analysis on a household's existing appliances, which enabled them to model heterogeneity by specifying electricity demand function at the level of individual appliances.

Other residential electricity demand stud.0. 0ies also used a sample selection model based on Heckman (1979) to address the block rate structure. The basic idea of the sample selection model is that the outcome of variable x is observed only if some criterion defined with respect to variable z is met. The common form of the model has two stages. In the first stage, the dichotomous variable z determines whether x is observed; x is observed only if $z=1$. In the second stage, the expected value of x conditional on it being observed is estimated.[3] For the present study, however, we are interested primarily in modeling incidental truncation, where the usual approach is to add an explicit selection equation to the population model of interest:

$$y = x\beta + u, \; E(u \mid x) = 0, \tag{4.3}$$

$$s = 1[z\gamma + v \geq 0], \tag{4.4}$$

where $s_i = 1$ if we observe y, and $= 0$ otherwise. We assume that elements of x and z are always observed, and we write $x\beta = \beta_0 + \beta_1 x_1 + \dots + \beta_k x_k$ and $z\gamma = \gamma_0 + \gamma_1 z_1 + \dots + \gamma_m z_m$. The equation can be estimated by OLS, given a random sample. The selection equation (4.4) depends on observed variables, z_h and an unobserved error, v. For the following proposed model to work well, x should be a strict subset of z. Using all n observations, estimate the probit model of s_i on z_i and obtain the estimate for the inverse mills ratio, $\hat{\lambda}_h$. Then, using the selected sample—that is, observations for which $s_i = 1$ (say, n_1 of them)—run the regression of y_i on $x_i, \hat{\lambda}_i$.[4]

Terza and Welch (1982) and Terza (1986) used a two-stage method similar to one developed by Heckman in analyzing increasing block tariffs. Their analyses required a specification of which block a household consumes in, and in their studies the choice of block could be explained with reference to consumer surplus. The two-stage probit approach applied in estimating electricity demand captures the declining block pricing. The approach consists of (1) estimating the probit model of the observed rate block outcomes and (2) using the probit results to compute the "correction factor" that the researchers included in the demand equation, which can be estimated by OLS. According to Terza (1986), this correction factor serves to purge the demand equation of the negative correlation between the price variable and the random error term.

Maddock, Castano, and Vella (1992) suggested a similar approach. They presented an estimator for generalized selectivity bias based on Heckman's sample selection estimator. (They called their approach the "generalized Heckman approach.") In that same report, they applied Burtless and Hausman's (1978) technique[5] in dealing with nonlinear prices, and they concluded that Hausman's method produces perfectly credible results—that is, the signs are right, the pattern of results is consistent, there is no evidence of heteroskedasticity, and the parameters are about the right magnitudes. They compared the results with alternative methods of estimating electricity demand; and, to resolve the difference between the results of the methods, they suggested the use of the said Heckman approach to treat the sample selection model. They used that model in estimating demand for electricity in Colombia, with a pricing system that included a connection fee and an increasing block rate structure in five steps.

---

3. See the summary of Heckman's sample selection model in Sweeney (2005).

4. This discussion of incidental truncation was taken from Wooldridge (2003).

5. Burtless and Hausman (1978) offered a sophisticated technique to analyze labor supply responses under nonlinear income taxation. They examined the negative income tax program that created a nonconvex budget set, and incorporated the federal income tax that created convex budget sets. Their model allowed distribution of preferences for work in the population or individual variations in tastes (heterogeneity); that is, two individuals who face the same budget sets may prefer to work substantially different amounts. They estimated a two-error model: measurement error and heterogeneity error. The former was assumed to be additive, but the latter was assumed to be located in the income coefficient and constrained to be of theoretically correct sign. Their method requires using complex statistical technique in computing the maximum likelihood estimates.

Measurement of Welfare

We will discuss the derivation of our measure of welfare before going into the details of our own estimation of demand.[6] Hausman (1981) derived an exact measure of consumer surplus coming from the observed market demand. Deriving consumer surplus in this way is very appealing because we can use the parameters from the estimated demand to give us a measure of welfare—*compensating variation.*—that is defined as the amount of money the household would need to be given at the new set of prices to attain the prereform level of utility. Hausman's derivation draws heavily from the duality in consumer theory that links the primal and dual problems in consumer optimization. The primal problem of consumer choice is when a consumer chooses a consumption pattern so as to maximize her utility u, subject to given price p and exogenous income y; that is,

$$\text{Maximize } u = u(x), \text{ subject to } p \bullet x = y. \tag{4.5}$$

The dual problem of consumer choice, on the other hand, is the mirror of the primal problem: a consumer chooses a consumption pattern so as to minimize her expenditure y (total expenditure or income) on consumption, given price p and exogenous utility level u; that is,

$$\text{Minimize } y = p \bullet x, \text{ subject to } u = u(x). \tag{4.6}$$

In both problems, optimal values of x are being sought. In the primal problem, the solution is a set of the Marshallian demand function, $x(p,y)$. In the dual problem, the determining variables are u and p, so we have the cost-minimizing demand function $h(p,u)$—also called the "Hicksian demand function." Each of these solutions can be substituted back into its respective problems to give (1) the maximum attainable utility $v(p,y)$ from the primal problem and (2) the minimum attainable cost $e(p,u)$ of the dual problem. Therefore,

$$v(p,y) = \max [u(x); p \bullet x = y] \tag{4.7}$$

$$e(p,u) = \min [p \bullet x; u (x) = u]. \tag{4.8}$$

The function $v(p,y)$ also is called the "indirect utility function," and the function $e(p,u)$ can be called the "cost or expenditure function." The important property of the expenditure function is that its partial derivative with respect to price gives the Hicksian compensated demand curves:

$$\frac{\partial e(p,\bar{u})}{\partial p_j} = h_j(p,\bar{u}). \tag{4.9}$$

Another useful property is that of the indirect utility function using Roy's identity, which yields the observed market demand curves as partial derivatives of $v(p,y)$:

$$x_j (p,y) = -\frac{\partial v(p,y) / \partial p_j}{\partial v(p,y) / \partial y}. \tag{4.10}$$

We will use the expenditure function to derive the explicit utility function that will enable us to measure the change in consumer surplus. Using the expenditure function makes computations easy because the arguments of the function depend only on the reform under consideration and are completely independent of preferences. In the expenditure function, preferences are described by the form of the function, and opportunities are described by the values of the function's arguments. In terms of the expenditure function, compensating variation is defined by

$$CV = e(p^0,u^0) - e(p^1,u^0) \tag{4.11}$$
$$= e(p^1,u^0) - y^0.$$

---

6. We are using Hausman's (1981) derivation of consumer's surplus.

To derive the exact compensating variation, we must take the observed market demand curve and use the Roy's identity from equation (4.10) to integrate and derive the indirect utility function. Inversion of the indirect utility gives the expenditure function, which enables us to calculate the compensating variation in equation (4.11). We will use our demand estimates to simulate the impact of reforms, that is, in this case assuming an increase in the price of electricity.

Estimation Procedure

Residential Electricity Demand

Our model analyzes the demand for electricity, taking the household appliance stock and dwelling characteristics as fixed. Our economic variables are the household budget, the price of electricity, virtual income, household characteristics, dwelling characteristics, regional dummies, and year dummy. Our sample is limited to the households that have been determined by survey to have access to electricity and pay for it. In this report, we will use the constant elasticity demand specification in which z is the vector of household characteristics, x is the demand for electricity, p is the price of electricity, and y is the total household expenditure or budget:

$$x = e^{z\gamma} p^a y^b. \tag{4.12}$$

Equation (4.12) often is estimated in log-linear form as

$$\log x = \gamma Z + a\log(p) + b\log(y). \tag{4.13}$$

We specify the residential demand for electricity as

$$\ln kWh = \alpha_0 + a \ln price + b \ln budgetpc + \beta_1 year\, 2003 \tag{4.14}$$
$$+ \sum_j \gamma_j educ_j + \sum_j \delta_j region_j + \varepsilon.$$

The model consists of three steps. The first step involves estimating the probit model for household spending below or above the previously described *kink.* Basically, we are using equation (4.4)—in this case, our selection equation $s = 1$ if the household spends above the kink, and 0 if it spends below the kink. The major implication of using this model is that we should have at least one element in our probit equation that is not also in our demand function; in other words, this variable should affect selection (being above the kink) but should not have partial effect on demand for electricity. For the following reasons, in this report the *excluded variable is the fixed payment* (see table 4.1 for details):

1. Fixed payment does not enter the demand equation because of the linearization of the budget constraint.
2. Fixed payment may affect whether the consumer is beyond the kink.
3 Fixed payment is a completely exogenous variable because it is determined by the government.
4. This is a time-variant variable; that is, for some regions, it changes over time.

We will compute the inverse Mills ratio from the probit equation that will be included as one of the explanatory variables in the demand regression. This first-step regression is needed to capture the impact of dropping 2,308 households that spent below the kink because there is no way we can ever measure the demand for those observations.[7]

The second step of the three-step method addresses the concern about virtual income's endogeneity. We will use the real expenditure as an instrumental variable for virtual income. We

---

7. Dropping 2,308 observations can be considered a problem of incidental truncation that is addressed by the first-step regression.

Table 4.1. *Regional Classification*

| New regional classification | Classification of households by electricity expenditure | | Total (n) |
	Below kink (n)	Above kink (n)	
1	121	3,585	3,706
2	176	2,567	2,743
4	206	9,829	10,035
5	153	2,876	3,029
6	184	3,916	4,100
7	137	3,568	3,705
8	189	2,630	2,819
9	117	1,800	1,917
10	131	2,778	2,909
11	128	2,888	3,016
12	96	2,521	2,617
14	116	2,157	2,273
15	175	1,076	1,251
16	314	1,979	2,293
3+13[a]	65	14,719	14,784
Total	2,308	58,889	61,197

Source: Author's calculations.
a. This is the combined region 13 (the national capital region) plus region 3.

will regress the virtual income with the real expenditure and take the predicted residuals. The predicted residuals and the inverse Mills ratio are included in the demand equation as one of the regressors to complete our third step, demand estimation using OLS.

Compensating Variation

In this section (based on Hausman [1981]), we will derive compensating variation using the constant elasticity demand specification in equation (4.12). First, we need to find the indirect utility function by using the technique of separating variables to find the following:

$$v(p,y) = c = -e^{Z\gamma} \bullet \frac{p^{1+a}}{1+a} + \frac{y^{1-b}}{1-b}, \tag{4.15}$$

where c is the constant of integration, which we set equal to the initial utility level $\bar{u}$. The following are two conditions that help us determine if we have a valid indirect utility that arises from consumer maximization: (1) the indirect utility function is continuous and homogenous of degree 0 in prices and income; and (2) the indirect utility function is a decreasing function in prices, so that $a \leq 0$, and it is increasing in income if $b \leq 0$. A third condition the indirect utility must satisfy is quasi-concavity that is equivalent to the Slutsky condition:

$$\frac{\partial h(p,u)}{\partial p} - \frac{\partial x(p,y)}{\partial p} = x \bullet \frac{\partial x(p,y)}{\partial y} \tag{4.16}$$

$$s_{11} = \frac{\partial h(p,u)}{\partial p} = x \bullet \frac{\partial x(p,y)}{\partial y} + \frac{\partial x(p,y)}{\partial p}$$

$$s_{11} = x\left(\frac{a}{p} + \frac{bx}{y}\right) \leq 0$$

The expenditure function is

$$e(p, \bar{u}) = \left[(1 - b) \bullet (\bar{u} + e^{Z\gamma}) \bullet \frac{p^{(1+a)}}{(1 + a)} \right]^{1/(1-b)}.$$ (4.17)

The compensating variation in terms of expenditure function given in equation (4.11) is

$$CV(p^0, p^1, y^0) = \left\{ (1 - b) \bullet \left[\frac{e^{Z\gamma}}{1 + a} \bullet (p^{1^{1+a}} - p^{0^{1+a}}) \right] + y^{0(1-b)} \right\} - y^0$$ (4.18)

$$= \left\{ \frac{(1 - b)}{(1 + a)y^{0b}} \left[p^1 x^1 (p^1, y^0) - p^0 x^0 (p^0, y^0) \right] + y^{0(1-b)} \right\}^{1/(1-b)} - y^0.$$

According to Hausman (1981), as long as the Slutsky sign conditions are satisfied by the demand function, we can calculate the exact consumer surplus so that the compensating variation for a change in price from p^0 to p^1 using equation (4.18). Equation (4.18) is the formula for compensating variation that we used in our analysis.[8]

Descriptive Measures

Family Income and Expenditure Survey

Our data consist of a pooled cross-section of the 2000 and 2003 Family Income and Expenditure Surveys. The 2000 survey contained 39,000 observations; the 2003 survey had 41,000 observations. Our final sample consists of 61,197 observations, households that indicated they have access to electricity and reported positive spending on electricity. The surveys contain information about household total expenditure, income, total fuel spending per fuel group, household members, and dwelling characteristics. We used these parameters in our regression. Although FIES does not report the quantity of electricity consumed by the household, it can be calculated using the household's electricity expenditure divided by the price of electricity.

REGIONAL RECLASSIFICATION. We have combined regions 13 and 3 to enable our three-step model to work. This was done to force probit to retain the National Capital Region observations, although that region does not have fixed payment in its pricing schedule. The choice of region 3 as the combining region was natural because of its proximity to the National Capital Region. The number of observations based on the new regional classification is given in table 4.1.

INCOME CATEGORIES. The income quartile to which a household belongs is computed for the remaining sample, based on each household's real total expenditure. This computation is done by calculating income quartile per year and then combining both years (2000 and 2003) so that there is no need to readjust the expenditure/income to some base year. Table 4.2 shows the number of observations per income quartile and the mean electricity expenditure (in Philippine pesos) and consumption (in kWhs) per quartile.

Price of Electricity

From the Philippine National Electrification Administration, we obtained the prices of electricity in effect during the survey periods for all regions except the National Capital Region. For that region, the price of electricity came from the prevailing price of electricity charged by the Manila Electric Company, which is the main distribution utility in metropolitan Manila. The Nation-

---

8. The compensating variation computations assume all other goods as numéraire.

Table 4.2. Number of Observations, Mean Electricity Expenditure, and Mean Electricity Consumption, by Income Quartile

Income quartile	Observations (n)			Mean electricity expenditure (PhP)			Mean electricity consumption (kWh)		
	All	Below kink	Above kink	All	Below kink	Above kink	All	Below kink	Above kink
First	15,301	1,790	13,511	1,396.4	395.51	1,529.03	398.58	111.65	436.59
Second	15,298	406	14,892	2,658.9	410.01	2,720.24	724.85	111.38	741.58
Third	15,300	94	15,206	4,748.4	396.64	4,775.30	1,217.15	108.48	1,224.00
Fourth	15,298	18	15,280	11,009.4	462.67	11,021.82	2,614.87	118.06	2,617.81
Total	61,197	2,308	58,889	4,953.10	398.63	5,131.60	1,238.82	111.52	1,283.00

Source: Family Income and Expenditure Survey, National Statistics Office.
Note: kWh = kilowatt hour; PhP = Philippine peso.

Table 4.3. Price Schedule: Minimum kWh and Marginal Price

Region	Minimum payment (PhP)		Minimum consumption (kWh)		Rate above the minimum (PhP)	
	2003	2000	2003	2000	2003	2000
1	46.047	46.047	12.6667	12.6667	3.6363	3.6363
2	50.070	50.070	13.2857	13.2857	3.7872	3.7872
3	38.028	38.028	10.6923	10.6923	3.5642	3.5642
4	47.652	47.652	11.9286	11.9286	4.0956	4.0956
5	46.170	46.170	11.6364	11.6364	3.9569	3.9569
6	46.386	46.386	12.0000	12.0000	3.8606	3.8606
7	41.521	41.218	11.5000	11.5000	3.6938	3.6685
8	42.757	42.757	10.4545	10.4545	4.0758	4.0758
9	40.542	39.928	15.0000	15.0000	2.7027	2.6617
10	42.448	41.848	14.8750	14.8750	2.8462	2.8198
11	35.317	34.103	13.3333	13.3333	2.6252	2.5452
12	33.760	33.573	13.7500	13.7500	2.4553	2.4428
13	n.a.	n.a.	n.a.	n.a.	5.7453	4.8400
14	51.773	51.772	12.4000	12.4000	4.1292	4.2372
15	54.731	54.731	15.0000	15.0000	4.1058	4.1058
16	51.662	48.659	14.2857	13.5714	3.5145	3.4663

Sources: Philippine National Electrification Administration; Manila Electric Company.
Note: n.a. = not applicable.

al Electrification Administration also reports the minimum consumption level and the amount charged for it by electric cooperatives as well as the marginal price paid by households for consumption in excess of the minimum. The price of electricity varies by region (see table 4.3). Households that enjoy low price are in regions 9, 10, 11, 12, and 16, whereas those in regions 2, 4, 5, 14, 15 (the Autonomous Region in Muslim Mindanao), and the National Capital Region pay the highest price for the utility.

Estimation Results

Demand for Electricity

The results of the three-step regression method for all observations are given in table 4.4. The coefficient of the price in the third step can be interpreted as the price elasticity of demand, and the

Table 4.4. *Regression Results for All Observations*

	First step[a]			Second step[b]			Third step		
Variable	*Coefficient*	*z-statistic*	*Variable*	*Coefficient*	*t-statistic*	*Variable*	*Coefficient*	*t-statistic*	
fxpay	−0.007	−19.400	lntotexpc	1.000	.	lnprice	−0.864	−14.660	
totmem	0.069	8.920	totmem	0.000	0.660	lnbudgetpc	0.906	122.800	
age	0.013	10.790	age	0.000	−3.520	totmem	0.180	80.940	
year2003	0.015	0.620	year2003	0.000	−26.050	age	0.006	20.580	
primaryd	0.351	4.000	primaryd	0.000	−2.530	year2003	0.004	0.650	
hschoold	0.732	8.120	hschoold	0.000	−2.650	primaryd	0.121	3.630	
colleged	1.344	13.530	colleged	0.000	−2.780	hschoold	0.247	7.170	
nregion01	0.218	2.160	nregion01	0.000	28.610	colleged	0.348	9.400	
nregion02	0.193	1.790	nregion02	0.000	47.310	nregion01	−0.145	−7.660	
nregion04	0.691	6.940	nregion04	0.000	−108.920	nregion02	−0.274	−12.060	
nregion05	−0.117	−1.190	nregion05	0.000	−56.840	nregion04	0.014	0.900	
nregion06	0.098	0.990	nregion06	0.000	−25.420	nregion05	−0.234	−9.920	
nregion07	−0.260	−2.910	nregion07	0.000	62.980	nregion06	−0.265	−12.780	
nregion08	−0.538	−5.980	nregion08	0.000	−53.680	nregion07	−0.243	−12.480	
nregion09	−0.666	−7.180	nregion09	0.000	−7.030	nregion08	−0.311	−11.540	
nregion010	−0.381	−4.140	nregion010	0.000	−16.250	nregion09	−0.246	−9.430	
nregion011	−0.853	−9.610	nregion011	0.000	−59.740	nregion010	−0.333	−14.940	
nregion012	−1.030	−11.930	nregion012	0.000	−35.790	nregion011	−0.323	−13.130	
nregion014	0.319	2.750	nregion014	0.000	−52.830	nregion012	−0.326	−12.060	
nregion015	0.342	2.490	nregion015	0.001	40.700	nregion014	−0.471	−17.280	
nregion016	−0.236	−2.460	nregion016	0.000	−54.460	nregion015	−0.314	−10.170	
_cons	3.863	20.490	_cons	0.000	1.960	nregion016	−0.292	−11.540	
						uhat	383.946	11.210	
Observations (n)	61,197		Observations (n)	58,889		_cons	−2.651	−25.460	
Log pseudo-likelihood	−7408.94		F-statistics (21, 58,867)	.		Observations (n)	58,889		
Pseudo R^2	0.1660		R^2	1.0000		Censored observations (n)	2,308		
						F-statistics (24, 58,864)	1775.67		
						R^2	0.5772		

Source: Author's calculations.

a. This is a probit equation for the probability that a household spends above the kink, using the variable *fxpay* as the excluded variable.

b. The second step is regression of the virtual income by the real total expenditure. From this equation, we predict the residual, which is used in the third step (the demand equation) as one of the regressors.

coefficient of the virtual income is the income elasticity. The elasticities show correct signs: the price elasticity is –0.86 and the income elasticity is 0.91.

The coefficients for the household head characteristics are significant and have the correct signs. An additional household member increases the consumption of electricity, and the age of the household head has a positive effect on consumption. The year dummy is positive but not significant, perhaps because there was little difference between the prices in 2000 and 2003 for some regions in the Philippines.

The educational attainment dummies also showed the expected signs and significant coefficients; that is, as one becomes more educated, his electricity consumption increases. Based on the data, it appears that highly educated people have either more appliances or more energy-consuming appliances.[9]

Regional dummies, however, all had negative signs. That result was expected with the combined National Capital Region and region 3 as the base region, possibly because most households in that area are more affluent or own more energy-intensive appliances than do households in any other region. The coefficient inverse Mills ratio (*invmills*) and the residual (*uhat*) are also significant (table 4.5). For the residual, the significant *t*-statistic means that virtual income is endogenous.

9. See table 4A.4 for the details of appliance ownership relative to educational attainment.

Table 4.5. *Comparison of Three-Step and OLS Demand Estimations*

Variable	Three-step method		OLS	
	Coefficient	*t-statistic*	*Coefficient*	*t-statistic*
lnprice	–0.864	–14.660	–0.647	–25.910
lnbudgetpc	0.906	122.800	0.906	122.640
totmem	0.180	80.940	0.183	86.410
age	0.006	20.580	0.007	23.850
year2003	0.004	0.650	–0.008	–1.360
primaryd	0.121	3.630	0.137	4.080
hschoold	0.247	7.170	0.279	8.230
colleged	0.348	9.400	0.407	11.710
nregion01	–0.145	–7.660	–0.171	–9.900
nregion02	–0.274	–12.060	–0.324	–17.610
nregion04	0.014	0.900	–0.015	–1.210
nregion05	–0.234	–9.920	–0.294	–16.590
nregion06	–0.265	–12.780	–0.311	–18.760
nregion07	–0.243	–12.480	–0.277	–16.290
nregion08	–0.311	–11.540	–0.383	–19.710
nregion09	–0.246	–9.430	–0.227	–8.800
nregion010	–0.333	–14.940	–0.319	–14.420
nregion011	–0.323	–13.130	–0.288	–12.400
nregion012	–0.326	–12.060	–0.278	–11.220
nregion014	–0.471	–17.280	–0.541	–26.650
nregion015	–0.314	–10.170	–0.392	–14.130
nregion016	–0.292	–11.540	–0.351	–16.880
invmills	0.044	4.490	n.a.	n.a.
uhat	383.946	11.210	n.a.	n.a.
_cons	–2.651	–25.460	–2.883	–34.190
Observations (n)	58,889		58,889	
F-statistic	(24, 58,864) = 1775.67		(22, 58,866) = 1811.19	
R^2	0.5772		0.5761	

Source: Author's calculations.

Note: n.a. = not applicable; OLS = ordinary least squares.

Table 4.6. Elasticities, by Income Quartile

	Price elasticity		Income elasticity	
Income quartile	*Three-step*	*OLS*	*Three-step*	*OLS*
First	−0.960	−0.562	0.501	0.501
Second	−1.117	−0.641	0.237	0.238
Third	−0.999	−0.663	0.308	0.310
Fourth	−0.809	−0.779	0.767	0.749

Source: Author's calculations.
Note: OLS = ordinary least squares.

The model was used to estimate demand, including various dwelling characteristics such as the structure of roofs and walls, but the change in coefficients was minimal.[10] We also estimated separate price and income elasticities per income category.[11] As in the regression using all observations, OLS gives consistently lower price elasticities per income category, but the income elasticities are similar to the results of the three-step method. Table 4.6 shows that the lowest income group has a relatively inelastic demand, second only to that of the fourth income quartile.[12] The reason for such inelastic demand may be that, compared with those in other income groups, households in the first quartile own very few appliances, so even if the price of electricity increases, they lack the freedom to adjust their consumption.[13] In addition, the first and fourth quartiles have the highest income elasticities (0.501 and 0.767, respectively).

Welfare Losses

We simulated the impact of a single price change—a 10 percent across-the-board increase in the price of electricity for all regions in the Philippines. This simulation exercise assumes that we have a linear budget set. The compensating variation is computed using (1) the parameter estimates from demand based on all observations—that is, parameters in table 4.4, which we will call *parameter (a)*; and (2) per-quartile demand parameters (shown in table 4.6 and detailed in table 4A.4), which we will call *parameter (b).*

Figure 4.6 shows the total compensating variation, increasing as income increases. This result is true using both parameters. However, there is a notable difference in mean compensating variation for the second and third quartiles: the compensating variation using parameter (b) is less than the compensating variation using parameter (a).

It appears, however, that using compensating variation alone as a measure of welfare loss gives an incomplete picture of the distributional implications of a price increase. We wonder about the burden of welfare loss in terms of its proportion to the total household expenditure. For that reason, we also computed the welfare effects in terms of *percentage loss*[14] by dividing compensating variation by the total real expenditure per capita. Figure 4.7 shows that if we use parameter (a), our conclusion is unchanged—that is, welfare as measured by percentage loss is strictly increasing as income increases.

However, if we use parameter (b), the distributional implications change dramatically. Figure 4.8 shows that the percentage loss is increasing as income increases; the loss of the poorest

---

10. See table 4A.2, which compares runs with and without dwelling characteristics.
11. See table 4A.3 for the detailed results of the three-step regression by income quartile.
12. Reiss and White (2002) found that the electricity consumption of the lowest income group had a more elastic demand.
13. See table 4A.4 for the details of appliance ownership by income category.
14. Simply put, percentage loss is the ratio of welfare loss to real expenditure.

group is greatest among the lower-income groups. This is true for both the OLS and three-step methods. This outcome may imply that the poorest group loses because it has very low income to start with (that is, any increase in price that translates into higher expenditure is translated

Figure 4.6. *Mean Compensating Variation*

	First quartile	Second quartile	Third quartile	Fourth quartile
All observations	−14,794.08	−20,396.75	−29,997.79	−64,919.25
Per quartile	−14,587.68	−17,949.30	−28,261.04	−66,021.28
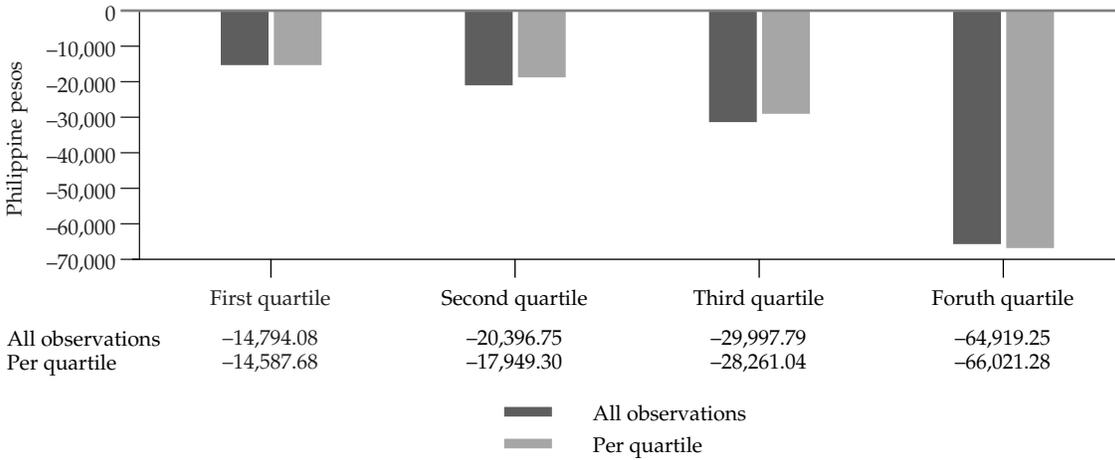
Source: Author's calculations.

Figure 4.7. *Mean Percentage Loss Using Parameters from Demand Estimates of All Observations*
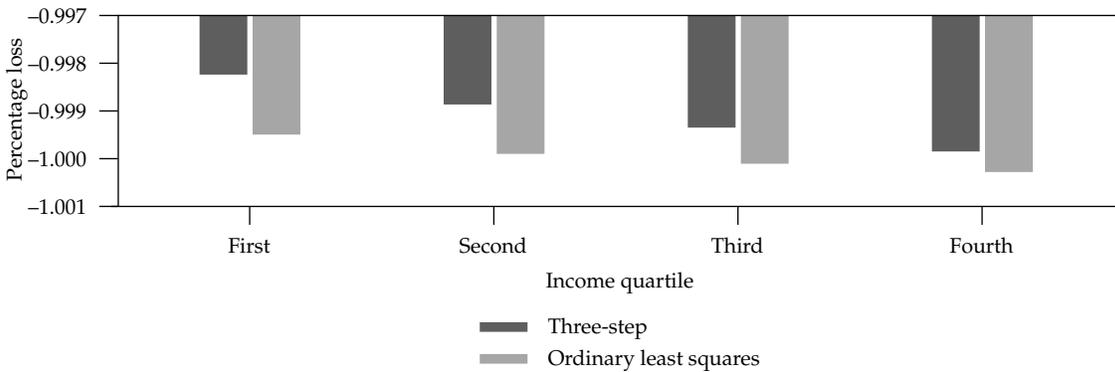
Source: Author's calculations.

Figure 4.8. *Mean Percentage Loss Using Parameters from Per-Quartile Demand Estimation*
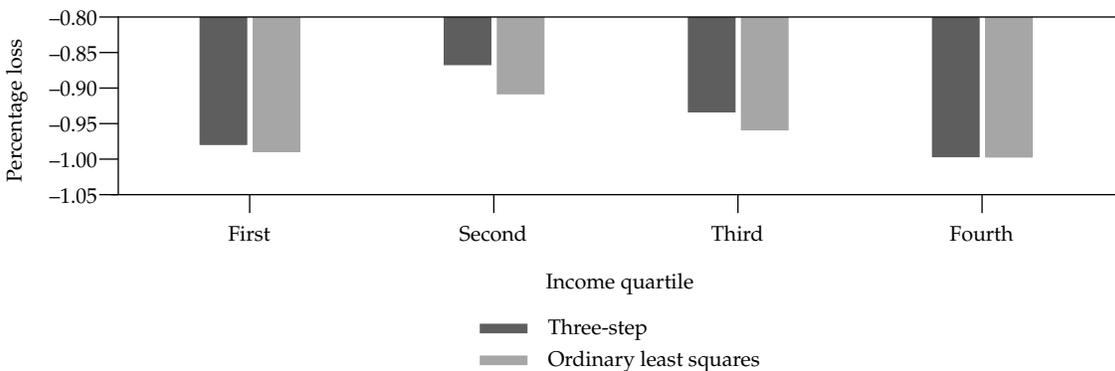
Source: Author's calculations.

into a higher-percentage loss). This finding also may imply that the electricity price subsidies provided to this income group will mask the impact of a price increase but will not change the real cause of higher welfare loss, namely, low real income.

Conclusion

The residential demand curve is estimated, taking into consideration the difficulty posed by such estimation: the nonlinearity in the budget set caused by fixed payments. In this report, we have tried to treat these issues by using a three-step method that addresses the problems of non-random selection and the endogeneity of the household budget used in demand estimation. The residential demand is computed for all observations and compared with the results of OLS. The results of the two approaches are not much different in terms of magnitude and signs of the co-efficient.

Although we did not make any explicit calculation on the precise impact of reform on the price of electricity, we based the simulation exercise on an increase in price because its impact probably will be of greatest interest in policy discussions. We simulated the impact of a 10 per-cent increase in price, assuming a linear budget set using the parameters of demand estimated for all observations and the per-quartile parameters.

We found that the distributional implication of the price change will depend on the choice of welfare measure and the parameters of demand used. In general, we found that, using compen-sating variation alone, the loss increases as the income of the group increases. However, distrib-utional implications change when we use the parameters of per-quartile demand and compute percentage loss instead: the loss is highest among the lower-income groups. This finding sug-gests an important policy implication concerning government-implemented lifeline subsidies that give preferential electricity tariffs to marginal consumers of electricity. Although a lifeline subsidy may be able to soften the impact of a price increase for the poorest group, it may not be able to address the real cause of higher welfare loss—that is, poverty.

Annex

Table 4A.1. Regression of Dwelling Characteristics with Price of Electricity

Variable	Wall1 Coefficient	Wall1 t-statistic	Wall2 Coefficient	Wall2 t-statistic	Wall3 Coefficient	Wall3 t-statistic
pricepower	0.009	1.400	–0.009	–1.560	0.001	0.430
fxpay	0.000	–2.210	0.000	2.370	0.000	–0.350
year2003	0.001	0.420	0.001	0.450	–0.003	–3.030
nregion01	–0.060	–6.530	0.066	7.350	–0.006	–2.270
nregion02	–0.047	–4.180	0.056	5.180	–0.010	–3.060
nregion04	–0.013	–1.430	0.015	1.720	–0.002	–0.870
nregion05	–0.088	–8.410	0.093	9.100	–0.005	–1.630
nregion06	–0.231	–24.090	0.233	25.010	–0.003	–0.980
nregion07	–0.126	–14.970	0.130	15.910	–0.004	–1.890
nregion08	–0.117	–11.470	0.128	12.930	–0.011	–4.010
nregion09	–0.180	–15.800	0.185	16.630	–0.005	–1.410
nregion010	–0.068	–7.140	0.069	7.370	0.000	–0.150
nregion011	–0.112	–10.010	0.115	10.580	–0.003	–1.050
nregion012	–0.172	–13.980	0.177	14.700	–0.004	–1.190
nregion014	0.076	5.620	–0.070	–5.360	–0.005	–1.440
nregion015	–0.159	–10.000	0.156	10.060	0.003	0.720
nregion016	–0.075	–6.820	0.079	7.380	–0.004	–1.320
_cons	0.864	24.630	0.120	3.510	0.015	1.560
Observations (n)	61,197		61,1197		61,197	
F-statistics	(17, 61,179) = 165.84		(17, 61,179) =191.93		(17, 61,179) = 4.78	
R^2	0.0441		0.0481		0.0013	

Variable	Roofs1 Coefficient	Roofs1 t-statistic	Roofs2 Coefficient	Roofs2 t-statistic	Roofs3 Coefficient	Roofs3 t-statistic
pricepower	–0.002	–0.370	0.000	0.030	0.002	1.320
fxpay	0.000	–2.670	0.000	2.780	0.000	–0.140
year2003	0.016	5.000	–0.013	–4.320	–0.003	–3.020
nregion01	0.005	0.580	0.003	0.420	–0.008	–3.750
nregion02	0.011	1.030	–0.002	–0.210	–0.009	–3.140
nregion04	0.005	0.630	–0.002	–0.210	–0.004	–1.640
nregion05	–0.185	–19.120	0.192	20.340	–0.007	–2.650
nregion06	–0.138	–15.490	0.143	16.500	–0.005	–2.240
nregion07	–0.067	–8.570	0.069	9.070	–0.002	–1.010
nregion08	–0.158	–16.760	0.169	18.430	–0.011	–4.540
nregion09	–0.204	–19.310	0.210	20.440	–0.006	–2.280
nregion010	–0.073	–8.170	0.075	8.700	–0.003	–1.160
nregion011	–0.050	–4.850	0.054	5.340	–0.004	–1.330
nregion012	–0.120	–10.470	0.124	11.110	–0.004	–1.360
nregion014	0.086	6.910	–0.077	–6.350	–0.009	–2.750
nregion015	–0.119	–8.060	0.121	8.450	–0.003	–0.680
nregion016	–0.213	–20.980	0.222	22.430	–0.009	–3.330
_cons	0.924	28.430	0.068	2.150	0.007	0.870
Observations (n)	61,197		61,1197		61,197	
F-statistics	(17, 61,179) = 186.64		(17, 61,179) = 207.83		(17, 61,179) = 8.18	
R^2	0.0493		0.0546		0.0023	

Source: Author's calculations.

Note: Regressing the wall types on the price of electricity, fixed payment, and regional and year dummies resulted in insignificant coefficients. The dwelling types are (1) *wall1/roofs1* made up of strong or mixed but strong materials, (2) *wall2/roofs2* made up of light or mixed but light materials, and (3) *wall3/roofs3* made up of makeshift materials or mixed but salvaged materials.

Table 4A.2. *Comparison of Results of the Three-Step Model, Without and With Dwelling Characteristics for All Observations*

Variable	Without dwelling		With dwelling	
	Coefficient	t-statistic	Coefficient	t-statistic
lnprice	–0.864	–14.660	–0.875	–14.960
lnbudgetpc	0.906	122.800	0.875	115.260
totmem	0.180	80.940	0.176	79.560
age	0.006	20.580	0.006	20.320
year2003	0.004	0.650	0.005	0.800
primaryd	0.121	3.630	0.120	3.600
hschoold	0.247	7.170	0.239	6.990
colleged	0.348	9.400	0.340	9.390
nregion01	–0.145	–7.660	–0.137	–7.430
nregion02	–0.274	–12.060	–0.270	–12.190
nregion04	0.014	0.900	0.019	1.200
nregion05	–0.234	–9.920	–0.224	–9.880
nregion06	–0.265	–12.780	–0.225	–11.510
nregion07	–0.243	–12.480	–0.224	–11.820
nregion08	–0.311	–11.540	–0.302	–11.630
nregion09	–0.246	–9.430	–0.226	–8.570
nregion010	–0.333	–14.940	–0.337	–15.240
nregion011	–0.323	–13.130	–0.314	–12.720
nregion012	–0.326	–12.060	–0.302	–10.980
nregion014	–0.471	–17.280	–0.476	–17.320
nregion015	–0.314	–10.170	–0.303	–9.980
nregion016	–0.292	–11.540	–0.291	–11.870
wall1	n.a.	n.a.	0.165	3.010
wall2	n.a.	n.a.	–0.017	–0.310
roofs1	n.a.	n.a.	–0.051	–0.850
roofs2	n.a.	n.a.	–0.038	–0.630
invmills	0.044	4.490	0.046	4.900
uhat	383.946	11.210	389.335	11.290
_cons	–2.651	–25.460	–2.386	–21.040
Observations (n)	58,889		58,889	
F-statistic	(24, 58, 864) = 1775.67		(28, 58 860) = 1583.23	
R^2	0.5772		0.5830	

Source: Author's calculations.

Note: n.a = not applicable. The three-step model also was estimated when some dwelling characteristics were included in the regression. The results, however, are not much different from the results reported in table 4.4.

Table 4A.3. *Per-Quartile Regression, Three-Step Estimation Results*

a. First quartile

First step[a]			Second step[b]			Third step		
Variable	Coefficient	z-statistic	Variable	Coefficient	t-statistic	Variable	Coefficient	t-statistic
fxpay	−0.007	−23.190	lntotexpc	1.000	.	lnprice	−0.960	−2.970
totmem	0.011	1.060	totmem	0.000	−1.230	lnbudgetpc	0.501	20.290
age	0.008	5.830	age	0.000	−2.210	totmem	0.106	17.910
year2003	−0.082	−2.630	year2003	0.000	−13.470	age	0.004	5.790
primaryd	0.323	3.220	primaryd	0.000	−0.500	year2003	0.019	1.420
hschoold	0.523	4.960	hschoold	0.000	−0.740	primaryd	0.159	3.870
colleged	0.747	5.890	colleged	0.000	−1.120	hschoold	0.219	4.580
nrregion01	0.528	3.720	nrregion01	0.000	13.590	colleged	0.266	4.320
nrregion02	0.415	2.820	nrregion02	0.000	37.910	nrregion01	0.019	0.480
nrregion04	0.707	5.020	nrregion04	0.000	−76.720	nrregion02	−0.048	−0.820
nrregion05	0.184	1.330	nrregion05	0.000	−57.170	nrregion04	0.075	1.520
nrregion06	0.291	2.110	nrregion06	0.000	−29.540	nrregion05	−0.069	−1.030
nrregion07	−0.047	−0.370	nrregion07	0.000	61.570	nrregion06	−0.119	−2.100
nrregion08	−0.198	−1.560	nrregion08	0.000	−55.610	nrregion07	−0.059	−1.320
nrregion09	−0.337	−2.600	nrregion09	0.000	−12.610	nrregion08	−0.175	−2.210
nrregion010	−0.070	−0.550	nrregion010	0.000	−18.920	nrregion09	−0.090	−1.080
nrregion011	−0.658	−5.420	nrregion011	0.000	−57.780	nrregion010	−0.186	−2.650
nrregion012	−0.687	−5.910	nrregion012	0.000	−37.920	nrregion011	−0.176	−1.830
nrregion014	0.453	2.680	nrregion014	0.000	−47.590	nrregion012	−0.217	−1.880
nrregion015	0.737	4.190	nrregion015	0.002	51.800	nrregion014	−0.197	−2.230
nrregion016	0.075	0.540	nrregion016	0.000	−62.610	nrregion015	0.145	1.770
_cons	3.812	23.060	_cons	0.000	2.100	nrregion016	−0.014	−0.240
						invmills	0.080	1.620
						uhat	82.618	1.620
						_cons	1.505	3.300
Observations (n)	15,301		Observations (n)	13,511		Observations (n)	13,511	
Log pseudo-likelihood	−5309.58		F-statistics (21, 13,489)	.		Censored observations (n)	1,790	
Pseudo R^2	0.0503		R^2	1.0000		F-statistics (24,13,486)	42.23	
						R^2	0.1345	

92

b. Second quartile

First step[a]			Second step[b]			Third step		
Variable	Coefficient	z-statistic	Variable	Coefficient	t-statistic	Variable	Coefficient	t-statistic
fxpay	-0.012	-2.380	lntotexpc	1.000	.	lnprice	-1.117	-6.890
totmem	-0.022	-1.310	totmem	0.000	-1.650	lnbudgetpc	0.237	5.480
age	0.013	4.480	age	0.000	0.800	totmem	0.019	2.070
year2003	0.028	0.490	year2003	0.000	-31.460	age	0.007	11.260
primaryd	-0.059	-0.230	primaryd	0.000	0.260	year2003	-0.006	-0.520
hschoold	0.103	0.400	hschoold	0.000	0.140	primaryd	0.089	1.310
colleged	0.399	1.450	colleged	0.000	0.100	hschoold	0.216	3.160
nregion01	0.756	1.470	nregion01	0.000	36.380	colleged	0.317	4.510
nregion02	1.072	1.430	nregion02	0.000	94.640	nregion01	-0.072	-2.010
nregion04	1.267	2.090	nregion04	0.000	-237.030	nregion02	-0.224	-5.450
nregion05	0.528	1.010	nregion05	0.000	-132.690	nregion04	0.052	1.530
nregion06	0.972	1.800	nregion06	0.000	-68.230	nregion05	-0.107	-2.410
nregion07	0.247	0.900	nregion07	0.000	162.890	nregion06	-0.203	-5.620
nregion08	0.034	0.100	nregion08	0.000	-127.950	nregion07	-0.199	-5.690
nregion09	-0.193	-0.800	nregion09	0.000	-33.230	nregion08	-0.146	-2.740
nregion010	0.390	1.210	nregion010	0.000	-47.780	nregion09	-0.286	-4.680
nregion011	-0.777	-2.710	nregion011	0.000	-148.880	nregion010	-0.290	-5.480
nregion012	-1.031	-3.050	nregion012	0.000	-95.280	nregion011	-0.289	-4.760
nregion014	0.997	1.180	nregion014	0.000	-130.760	nregion012	-0.349	-5.040
nregion015	1.518	1.470	nregion015	0.001	88.940	nregion014	-0.318	-5.680
nregion016	0.969	1.230	nregion016	0.000	-134.480	nregion015	-0.180	-3.180
_cons	7.373	3.140	_cons	0.000	4.650	nregion016	-0.222	-5.370
Observations (n)	15,298		Observations (n)	14,892		invmills	0.053	3.570
Log pseudo-likelihood	-1494.35		F-statistics (21, 14,870)	.		uhat	379.026	1.380
Pseudo R^2	0.0913		R^2	1.0000		_cons	4.912	9.700
						Observations (n)	14,892	
						Censored observations (n)	406	
						F-statistics (24, 14,867)	41.09	
						R^2	0.1109.	

Table 4A.3, *continued*

c. Third quartile

First step[a]			Second step[b]			Third step		
Variable	Coefficient	z-statistic	Variable	Coefficient	t-statistic	Variable	Coefficient	t-statistic
fnxpay	−0.01	−1.40	lntotexpc	1.000	.	lnprice	−0.999	−8.460
totmem	−0.05	−1.83	totmem	0.000	2.660	lnbudgetpc	0.308	7.380
age	0.01	1.82	age	0.000	1.560	totmem	0.051	5.990
year2003	0.09	0.97	year2003	0.000	−31.380	age	0.009	13.860
primaryd	0.11	0.29	primaryd	0.000	0.630	year2003	0.000	−0.010
hschoold	0.46	1.15	hschoold	0.000	0.600	primaryd	0.048	0.560
colleged	0.54	1.32	colleged	0.000	0.730	hschoold	0.183	2.100
nregion01	0.32	0.59	nregion01	0.000	49.090	colleged	0.280	3.180
nregion02	0.48	0.62	nregion02	0.000	90.660	nregion01	−0.114	−3.270
nregion04	0.73	1.14	nregion04	0.000	−248.680	nregion02	−0.289	−6.350
nregion05	0.23	0.39	nregion05	0.000	−124.630	nregion04	0.031	1.060
nregion06	0.73	1.13	nregion06	0.000	−72.990	nregion05	−0.207	−4.520
nregion07	0.12	0.34	nregion07	0.000	140.260	nregion06	−0.284	−7.520
nregion08	−0.03	−0.08	nregion08	0.000	−122.500	nregion07	−0.279	−7.330
nregion09	−0.05	−0.11	nregion09	0.000	−30.070	nregion08	−0.264	−5.020
nregion010	0.19	0.44	nregion010	0.000	−49.360	nregion09	−0.280	−4.960
nregion011	−0.27	−0.58	nregion011	0.000	−142.220	nregion010	−0.413	−8.680
nregion012	−0.96	−2.47	nregion012	0.000	−94.690	nregion011	−0.415	−8.190
nregion014	0.43	0.50	nregion014	0.000	−124.900	nregion012	−0.354	−6.710
nregion015	0.11	0.10	nregion015	0.001	69.740	nregion014	−0.404	−7.650
nregion016	0.32	0.42	nregion016	0.000	−106.700	nregion015	−0.475	−6.420
_cons	5.41	2.29	_cons	0.000	−0.510	nregion016	−0.396	−8.270
						invmills	0.068	3.300
						uhat	1536.016	2.810
						_cons	4.187	8.760
Observations (n)	15,300		Observations (n)	15,206		Observations (n)	15,206	
Log pseudo-likelihood	−403.62		F-statistics (21, 15,184)	.		Censored observations (n)	94	
Pseudo R^2	0.1368		R^2	1.0000		F-statistics (24, 15,181)	50.13	
						R^2	0.1341	

d. Fourth quartile

First step[a]

Variable	Coefficient	z-statistic
fixpay	0.004	0.240
totmem	0.002	0.030
age	0.017	4.730
year2003	0.232	1.210
primaryd	-3.972	-2.180
hschoold	-3.571	-1.950
colleged	-2.807	-1.460
nregion01	n.a.	n.a.
nregion02	-6.913	-0.690
nregion04	-5.570	-0.580
nregion05	n.a.	n.a.
nregion06	-6.281	-0.670
nregion07	-5.933	-0.710
nregion08	n.a.	n.a.
nregion09	n.a.	n.a.
nregion010	n.a.	n.a.
nregion011	-3.996	-0.540
nregion012	n.a.	n.a.
nregion014	-6.812	-0.660
nregion015	-5.176	-0.470
nregion016	-6.910	-0.680
_cons	9.251	a

Observations (n) 12,565
Log pseudo-likelihood -1494.35
Pseudo R^2 0.0913
Observations dropped due to collinearity (n) 2,733

Second step[b]

Variable	Coefficient	t-statistic
lntotexpc	1.000	a
totmem	0.000	6.830
age	0.000	0.330
year2003	0.000	-23.330
primaryd	0.000	0.960
hschoold	0.000	1.090
colleged	0.000	1.150
nregion01	0.000	30.320
nregion02	0.000	37.060
nregion04	0.000	-135.330
nregion05	0.000	-75.390
nregion06	0.000	-51.890
nregion07	0.000	60.250
nregion08	0.000	-60.150
nregion09	0.000	-13.710
nregion010	0.000	-35.020
nregion011	0.000	-62.880
nregion012	0.000	-62.270
nregion014	0.000	-68.050
nregion015	0.000	31.780
nregion016	0.000	-52.450
_cons		-4.950

Observations (n) 15,280
F-statistics (21, 15258) a
R^2 1.0000

Third step

Variable	Coefficient	t-statistic
lnprice	-0.809	-8.610
lnbudgetpc	0.767	38.520
totmem	0.151	29.600
age	0.007	8.530
year2003	0.059	2.920
primaryd	0.298	1.450
hschoold	0.450	2.270
colleged	0.587	3.170
nregion01	n.a.	n.a.
nregion02	-0.507	-2.730
nregion04	-0.101	-0.720
nregion05	n.a.	n.a.
nregion06	-0.362	-2.170
nregion07	-0.430	-2.550
nregion08	n.a.	n.a.
nregion09	n.a.	n.a.
nregion010	n.a.	n.a.
nregion011	-0.543	-3.600
nregion012	n.a.	n.a.
nregion014	-0.759	-4.400
nregion015	-1.097	-7.590
nregion016	-0.673	-3.490
invmills	-0.010	-0.310
uhat	472.645	0.610
_cons	-1.003	-1.850

Observations (n) 12,547
Censored observations (n) 18
Dropped observations (n) 2,733
F-statistics (18, 12,528) 182.49
R^2 0.3789

Source: Author's calculations.

Note: For this income group, regional dummy variables 1, 5, 8, 9, 10, and 12, and the corresponding observations (585, 564, 448, 291, 493, and 352 households, respectively) were dropped because they predict success perfectly. These regions do not have any single observation spending below the kink—that is, the selection equation for all observations is $s=1$.

a. Those regions do not have observations/households in the fourth quartile.

Table 4A.4. *Other Descriptive Measures*

a. Appliance ownership and educational attainment: all observations

	Appliance group				
Educational attainment	*No other appliances (n)*	*Entertainment appliances (n)*	*Refrigeration appliances (n)*	*Cooling appliances (n)*	*Total (n)*
No grade completed	190	732	213	24	1,159
Completed elementary (or had some elementary)	1,859	12,678	6,230	564	21,331
Completed high school (or had some high school)	1,145	10,274	9,521	926	21,866
Attended college or continued until graduate school	252	3,618	10,122	2,849	16,841
Total	3,446	27,302	26,086	4,363	61,197

Note: It is assumed that cooling appliances are more energy intensive among the appliance group. This table shows that those who attended college have more energy-intensive appliances than those who did not. The computed correlation between appliance ownership and educational attainment is 0.3380.

b. Appliance ownership and income quartile: all observations

	Appliance group				
Income quartile	*No other appliances (n)*	*Entertainment appliances (n)*	*Refrigeration appliances (n)*	*Cooling appliances (n)*	*Total (n)*
First quartile	2,413	10,692	2,060	136	15,301
Second quartile	798	9,358	4,800	342	15,298
Third quartile	196	5,760	8,719	625	15,300
Fourth quartile	39	1,492	10,507	3,260	15,298
Total	3,446	27,302	26,086	4,363	61,197

c. Appliance ownership and income quartile: households who spend above the kink

	Appliance group				
Income quartile	*No other appliances (n)*	*Entertainment appliances (n)*	*Refrigeration appliances (n)*	*Cooling appliances (n)*	*Total (n)*
First quartile	1,816	9,533	2,027	135	13,511
Second quartile	696	9,077	4,784	335	14,892
Third quartile	182	5,690	8,710	624	15,206
Fourth quartile	36	1,483	10,501	3,260	15,280
Total	2,730	25,783	26,022	4,354	58,889

Sources: Author's calculations; appliance categories came from Danao (2001).
Note: Higher-income households own more energy-intensive appliances than do households in the lower-income categories. For example, there are cooling appliances in 3,260 of the households in the fourth income quartile, compared with 135 in the first income quartile.

References

Burtless, G., and J. A. Hausman. 1978. "The Effect of Taxation on Labor Supply: Evaluating the Gary Negative Income Tax Experiment." *Journal of Political Economy* 86 (6): 1103–30.

Cowing, T. G., and D. McFadden. 1984. *Microeconomic Modeling and Policy Analysis: Studies in Residential Energy Demand.* Orlando, FL: Academic Press.

Danao, R. A. 2001. "Short-Run Demand for Residential Electricity in Rural Electric Cooperatives Franchise Areas." *Philippine Review of Economics* 38 (2): 67–82.

Fisher, F. M., and C. Kaysen. 1962. *A Study in Econometrics: The Demand for Electricity in the United States.* Amsterdam: North-Holland Publishing.

Hall, R. E. 1973. "Wages, Income and Hours of Work in the U.S. Labor Force." In *Income Maintenance and Labor Supply,* ed. G. Cain and H. Watts, 102–62. Chicago: Markham Press.

Hausman, J. A. 1981. "Exact Consumer's Surplus and Deadweight Loss." *American Economic Review* 71 (4): 662–76.

Hausman J. A., M. Kinnucan, and D. McFadden. 1979. "A Two-Level Electricity Demand Model: Evaluation of the Connecticut Time-of-Day Pricing Test." *Journal of Econometrics* 10 (3): 263–89.

Heckman, J. 1979. "Sample Selection Bias as a Specification Error." *Econometrica* 47 (1): 153–61.

Houthakker, H. S. 1951. "Some Calculations of Electricity Consumption in Great Britain." *Journal of the Royal Statistical Society (A)* 114 (pt. III): 351–71.

Maddock, R., E. Castano, and F. Vella. 1992. "Estimating Electricity Demand: The Cost of Linearising the Budget Constraint." *Review of Economics and Statistics* 74 (2): 350–54.

Reiss, P., and M. White. 2004. "Household Electricity Demand, Revisited." Working Paper 8687, National Bureau of Economic Research, Cambridge, MA.

Sweeney, K. 2005. "Implementing and Interpreting Sample Selection Models." Slide presentation. Political Research Lab, Department of Economics, Ohio State University, Columbus, OH. http://psweb.sbs.ohio-state.edu/prl/Selection%20Models.pdf.

Taylor, L. 1975. "The Demand for Electricity: A Survey." *Bell Journal of Economics* 6 (1): 74–110.

Terza, J. 1986. "Determinants of Household Electricity Demand: A Two-Stage Probit Approach." *Southern Economic Journal* 52 (4): 1131–39.

Terza, J., and W. P. Welch. 1982. "Estimating Demand under Block Rates: Electricity and Water." *Land Economics* 58 (2): 181–88.

Wooldridge, J. 2003. *Introductory Econometrics, A Modern Approach,* 2nd ed. Cincinnati, OH: Thomson South-Western.

5

How to Improve Export Competitiveness in Mauritius

Marilyn Whan-Kan

Export competitiveness is defined as a country's ability to produce and sell goods and services in foreign markets at prices and quality levels that ensure long-run viability and sustainability. Mauritius is losing its competitiveness, both over time and relative to its main market rivals. When analyzing the trend in Mauritian competitiveness over time, using the unit labor cost index, one sees a declining trend, which is explained by real wage increases not being matched by productivity growth. This decline over time also is evident in the evolution of the terms of trade over a period of years. Low wages and low labor costs no longer are sources of competitive advantage for Mauritius because several Asian market rivals have much lower textile sector labor costs. Mauritian export prices tend to increase faster than those of its main competitors. The growth rate in manufacturing exports also tends to lag behind that of Southeast Asia. The problem is compounded by new challenges at the international level, related to Mauritius's loss of preferential markets. To improve export competitiveness, it is necessary to focus on one or a combination of the following measures: an increase in labor productivity, wage rate decreases, or currency depreciation. It appears that the most effective and sustainable way to improve competitiveness is to raise labor productivity because doing so acts directly on production costs. Unlike wage reduction and depreciation, productivity boosts raise the standard of living. Several measures can be used to increase labor productivity: maintaining a low rate of inflation and low interest rates, following international trends in setting interest rate levels, and allowing some degree of exchange rate flexibility within a stable range; training workers in new skills needed for technological change, focusing some training on management development and improved supervisory quality, promoting a higher-performance culture through organizational development, and stressing decision-making, communication, and teamwork skills; reducing transaction costs by cutting bureaucratic red tape and delays in project approvals, and improving both physical infrastructure and utility provision; and diversifying and differentiating export products, improving product quality, and upgrading technology by retooling and modernizing production processes.

Mauritius has been transformed gradually from a monocrop economy to a more diversified one over the period 1970 to the present. The economic structure for 1998–2002 (depicted in tables 5A.1 and 5A.2) rests on agriculture (mainly sugar), export-oriented manufacturing (mainly textiles), upmarket tourism, and financial and business services. The contributions to the island nation's gross domestic product (GDP) in 2002 were 6 percent for agriculture, 23 percent for manufacturing, 6 percent for tourism, and 10 percent for banking and financial services. The proportion of the workforce in the manufacturing sector rose from 26 percent in 1960 to 43 percent in 1990, while that in the agricultural sector fell from 40 percent to 17 percent over the same period. The manufacturing sector share in the economy has increased constantly since the rapid development of the export processing zone (EPZ) sector. EPZ production, dominated by textiles and garments, provided 70 percent of the total export revenue in 2002. Other main export commodities were sugar, molasses, and tea. The major export markets for the country's products are France, South Africa, the United Kingdom, and the United States.

The economic progress made by Mauritius since the mid-1980s is seen as a success story. Economic growth has averaged nearly 6 percent, and per capita GDP reached US$4,500 in 2003. Trade liberalization and access to global markets have played an important role in the Mauritian success, and the country has been able to attract foreign direct investment and take advantage of its outward-oriented strategy through its sound social and political climates. The country has benefited from the preferential access of its main export products to the European Union (EU) under the Lomé Convention and from its vigorous export promotion policies. Exports since the 1980s have been supported by the country's relatively high literacy rates and the availability of an underutilized female labor force, especially for garment exports. Import barriers have been liberalized gradually, thereby easing the adjustment of domestically oriented enterprises to import competition.

Mauritius, however, is losing its competitiveness. It is becoming increasingly difficult to compete with emerging low-wage garment-producing countries, as evidenced in recent years by the delocalization of low-skilled production to Madagascar. There are now strains in the labor market linked with patterns of international trade. The unemployment rate, which has increased since the 1990s, is related to poor employment growth in the country's manufacturing sector.

Today, the issue of ways to address these challenges is most pressing. The purpose of this report is to identify policies to enhance the competitiveness of Mauritian exports. The first part of the report deals with concepts, measures, and trends in competitiveness for Mauritius, and presents the main related challenges facing the country. The second part then discusses the relevant policy measures recommended to increase the nation's export competitiveness.

The Concept of Competitiveness

The concept of competitiveness is widely discussed in the literature, but it remains somewhat ambiguous. Some authors equate it with productivity, others with market share or export performance, and still others (especially Porter [1990]) see in it a whole range of company or industry attributes that provide a competitive advantage.

Competitiveness can be examined at three levels. At the *enterprise level*, it reflects the ability of a firm to sell and supply goods and/or services in a given market. The competitiveness of local firms is defined by a cost advantage over foreign competitors. At the *sectoral/industry level*, competitiveness refers to the extent to which a sector or industry offers the potential for growth and an attractive return on investment. Finally, at the *national level*, it refers to the extent to which a national environment is conducive or detrimental to business, thus enhancing or reducing the capacity of the economy to improve the standard of living.

Competitiveness refers to the ability of the enterprise/sector/country to produce and sell goods and services in domestic and foreign markets at prices and quality that ensure long-run

viability and sustainability. The Organisation for Economic Co-operation and Development's (OECD's) definition of competitiveness is

> the degree to which, under open market conditions, a country can produce goods and services that meet the test of foreign competition while simultaneously maintaining and expanding domestic real income. (OECD 1992)

Because it has been argued that firms rather than countries compete with each other (Krugman 1994), the concept of competitiveness at the country/national level has been defined to reflect the "quality of the environment for investment and for increasing productivity in a climate of macroeconomic stability and integration into the international economy" (Downs 2003, p. 12). The broader approach to measuring the degree of competitiveness is therefore multifactoral.

The OECD's definition of competitiveness proves to be a good guide toward making policy choices. It does not encourage short-lived export booms that fail to raise the standard of living. Instead, it leads policy decisions toward sustainably upgrading a country's competitive capabilities, and it provides the opportunity for countries to become partners who specialize in different economic activities emerging from their respective strengths.

A distinction of major importance is the one between competitiveness and comparative advantage. *Comparative advantage* results from high productivity and factor abundance as reflected by low factor prices, assuming that such other factors as product quality and sales services are being captured by the price. *Competitive advantage,* on the other hand, results not only from these real factors, but also from price distortions, such as subsidies and market price premia. For instance, an undervalued exchange rate adds to competitiveness, whereas overvaluation reduces it. It is clear that export industries may lose their ability to sell abroad either if wages are rising in excess of productivity or if the exchange rate appreciates well beyond its equilibrium value.

Measures and Trends in Export Competitiveness for Mauritius

A country's export competitiveness can be measured in several ways. It is possible to examine it through revealed or actual export performance or through factors that are expected to encourage good export performance (wages, exchange rate, incentives, and so forth). The latter can be measured either through time-series analysis or through cross-country comparisons.

Time-Series Analysis

UNIT LABOR COST. Changes in a country's competitiveness can be assessed by changes in the real unit labor cost (ULC) of production over time—the ratio of real wages to labor productivity. ULC is the remuneration of labor to produce one unit of output.

ULC measures have the advantage of covering all industries: exporters, potential exporters, and those competing with imports. For several reasons, however, it should not be interpreted as a comprehensive measure of competitiveness. First, ULC measures deal only with the cost of labor. Although labor costs account for the major share of inputs, the cost of capital and intermediate inputs also can be crucial factors in comparisons of cost competitiveness among countries. Second, the measures reflect only *cost* competitiveness. In the case of durable consumer and investment goods, for example, competitiveness also is determined by technological and demand factors. Third, measures of cost competitiveness may be distorted, for example, by the effects of bilateral market access agreements, subsidies, and tariff protection.

The trends in the index of ULC for Mauritian manufacturing and export sectors appear in figure 5.1. The increasing trend in ULC can be explained by real wage increases not being matched by productivity growth. Over the period, real wages rose while labor productivity declined as a result of high rates of absenteeism and turnover, poor work discipline, and so forth. This disparity tended to erode the competitiveness of Mauritian exports.

Figure 5.1. *Unit Labor Cost Index for Manufacturing and Export Sectors, 1982–2002*
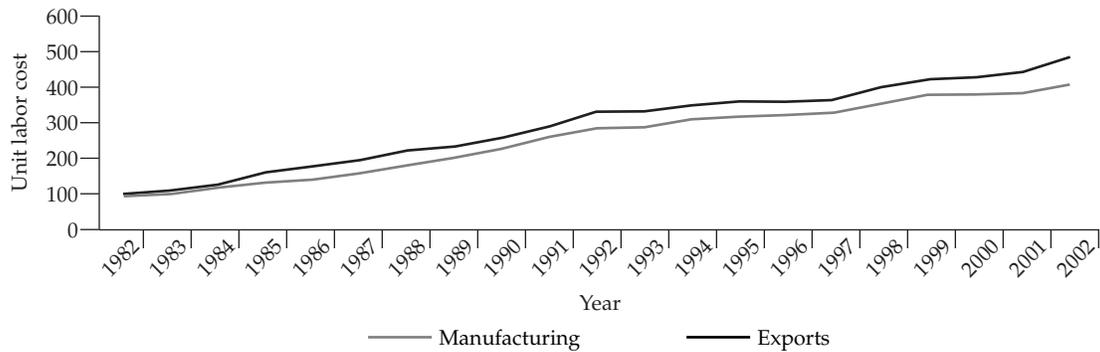
Sources: Mauritius Employers' Federation 1998; Central Statistics Office, Ministry of Finance and Economic Development, Republic of Mauritius.
    Note: Index values for 1982 = 100.

TERMS OF TRADE. The terms of trade (or the ratio of the prices of tradable goods to the prices of nontradable goods) also can be used as a measure of competitiveness. The terms-of-trade index measures the price movements of exports relative to imports:

$$\text{Terms-of-trade index} = \frac{\text{Export price index}}{\text{Import price index}} \tag{5.1}$$

A rise in the ratio means that a smaller volume of exports will pay for a larger volume of imports, whereas a decline indicates an unfavorable movement because a larger volume of exports must pay for the same volume of imports.

The use of this measure of competitiveness tends to mask a number of factors underlying the concept. Country-level competitiveness depends on a number of factors, including such macroeconomic variables as the volume of trade, resource allocation, and capital flows. Furthermore, the most appropriate measure of competitiveness is income terms of trade, which is the ratio of the value of exports to the price of imports. However, terms-of-trade calculations are complex, and data on the income terms of trade may not be readily available for many countries.

As is shown in figure 5.2, the terms-of-trade index for Mauritius experienced a declining trend from 1998 to 2003. This decline suggests that competitiveness decreased over the period on the following ground: as the prices of tradable goods decrease, relative to those of nontradable goods, producers have an incentive to decrease the production of tradable goods and increase the production of nontradable goods.

Figure 5.2. *Terms-of-Trade Index for Mauritius, 1990–2003*

Source: Central Statistics Office, Ministry of Finance and Economic Development, Republic of Mauritius.
Note: Index value for 1990 = 100.

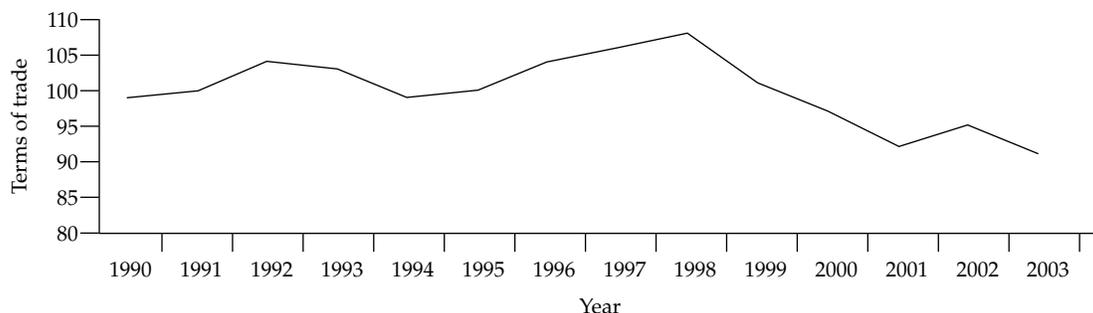REAL EFFECTIVE EXCHANGE RATE. The real effective exchange rate (REER) of a country is a commonly used measure of its competitiveness. The effective exchange rate (EER) is a country's nominal exchange rate, relative to that of a number of other countries that are considered competitors. A trade-weighted average exchange rate for the country, relative to other countries, is used. The REER is obtained by deflating the EER by appropriate price or cost (labor) deflators. Each of these deflators has advantages and drawbacks that determine its overall usefulness as an indicator of external competitiveness. A stronger REER indicates that the home country is less competitive. The broad implication is that restoring competitiveness means that the currency must weaken or domestic prices/costs will have to increase less than foreign prices/costs.

Figure 5.3 depicts the trends in the REER for Mauritius over the period beginning in 1970 or 1980 and ending in 2000. The trends imply a depreciation of the Mauritian currency. The exchange rates adjusted for inflation of consumer prices and unit labor costs reveal a milder real depreciation than do the GDP deflator and the export price. The latter two price measures also take traded goods into account and so are more likely to reflect the favorable prices introduced by preferential trading arrangements.

Normally, the developments of the REER shown in figure 5.3 would mean an increase in competitiveness for the country because, with the depreciation, exports are promoted. The REER, however, should be considered a misleading measure of competitiveness for Mauritius for the following reasons. First, the competitiveness of Mauritian exports fell because the increased costs of production outweighed the depreciation of the exchange rate. Second, the Mauritian REER tends to reflect the effects of macroeconomic policies, especially exchange rate management, rather than the actual level of export competitiveness.

To support this point, it is worth mentioning here that Mauritius devalued its currency by 30 percent in 1979 and by 20 percent in 1981, mainly to improve its external trade balance. It also

Figure 5.3. *REER Indexes for Mauritius, 1970/80–2002*
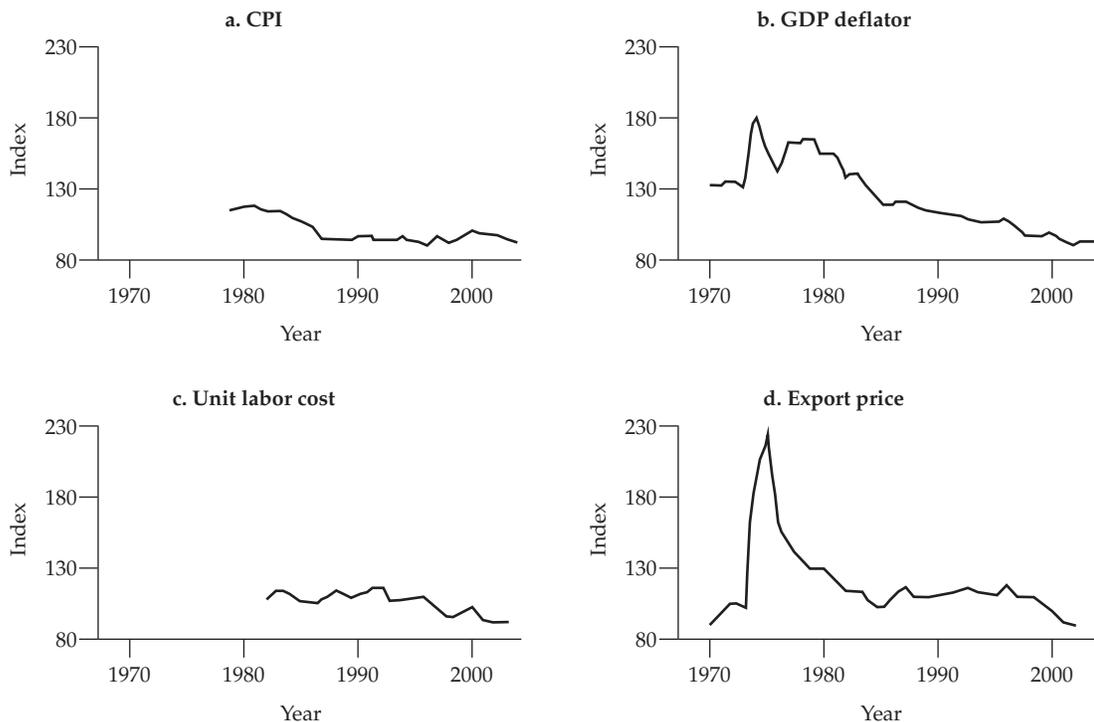
adopted a managed exchange rate policy in 1983 by which the central bank was authorized to intervene on the foreign exchange market to smooth out irregular fluctuations in its currency. Foreign exchange controls were liberalized partially in 1986 when commercial banks were allowed to undertake transactions of up to MUR 200,000 without the approval of the central bank. A further liberalization took place in 1994. The Exchange Control Act was suspended and free movement of foreign exchange was permitted. Both the managed exchange rate policy and foreign exchange liberalization were meant to increase the competitiveness of export enterprises on the world market.

Cross-Country Comparisons

LABOR COSTS. The unit labor cost measure can be useful for analysis at the level of the aggregate economy. However, the precise interpretation of a difference in ULC levels across countries depends on the source from which the change originates. For instance, an increase in labor costs can result from upward wage pressure or from a slowdown in productivity growth. Upward wage pressure may be triggered by an appreciation of a country's currency or a shortage in the labor market. A productivity slowdown may be caused by a rise in the sectoral share of the services sector, by a lack of technological progress, or by slow reforms in product and labor markets.

Table 5.1 shows comparative hourly labor compensation in the textile and apparel industries for several countries in 2002. The data confirm that low wages and labor cost are no longer a source of competitive advantage for Mauritius; there are several Asian countries with much lower labor costs in textiles. Low-cost textiles and clothing produced in China and India are expected to dominate the market in countries that are parties to the World Trade Organization (WTO) Agreement on Textiles and Clothing, thus lowering the world prices of these products. In the context of Mauritius's weak external competitiveness, the lower world prices would cause its share of global textiles and clothing to decrease further. This situation explains why Mauritius has tried to delocalize manufacturing to low-wage neighboring countries, such as Madagascar, to produce lower-quality products.

THE EXPORT PRICE INDEX. The competitiveness of a given country's export volumes is the differential between the country's export price and that of its competitors in their common markets. The export price index (EPI) is a measure of price changes among domestically produced Mauritian products exported to other countries. It measures pure price changes and takes account of all the main price-determining factors, such as country of destination, quality, mode of transport, and mode of payment. The EPI covers all domestic exports. It can serve as a basis to

Table 5.1. *International Comparison of Hourly Compensation in the Textile and Apparel Industries, 2002*
U.S. dollars

Economy	Textile industry	Apparel industry
Bangladesh	0.25	0.39
China, coastal area	0.69	0.88
China, other than coastal area	0.41	0.68
India	0.57	0.38
Madagascar	—	0.33
Mauritius	1.33	1.25
Pakistan	0.34	0.41
Sri Lanka	0.40	0.48

Source: U.S. International Trade Commission.
Note: — = not available. Includes wages and fringe benefits.

Figure 5.4. *EPI, Selected Countries, 1991–2002*
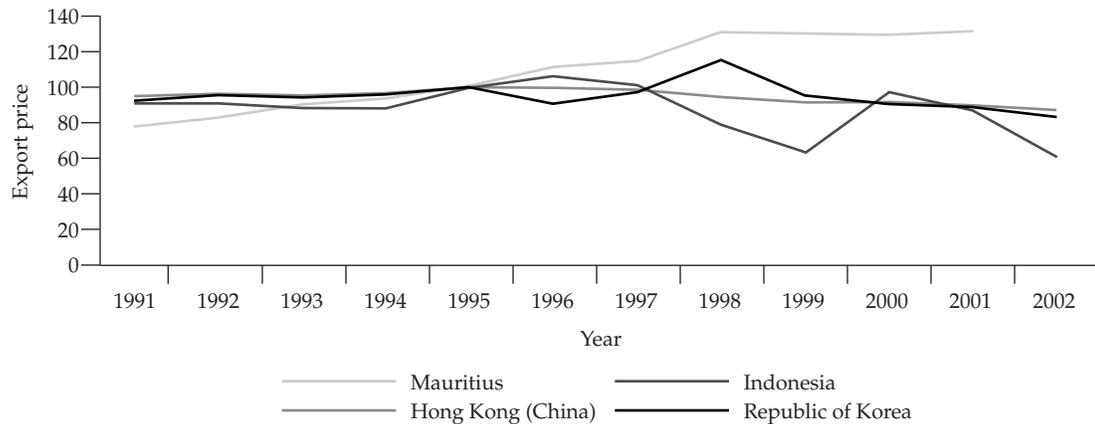
Source: IMF 2006.
Note: EPI = export price index. Index values for 1995 = 100.

assess the competitiveness of Mauritian products in relation to price trends among common products of other countries with which Mauritius competes for markets.

The EPI, however, is deficient on several grounds. First, international competition itself will tend to limit observed differences in export prices, especially in the longer term. Second, the calculation of export prices is restricted to goods actually traded.

Figure 5.4 compares the evolution of EPI in Hong Kong (China), Indonesia, the Republic of Korea, and Mauritius between 1991 and 2002. It can be seen that, of the four economies, Mauritius was the only one whose EPI increased in 2001, relative to the situation in 1991.

EXPORT GROWTH. Export competitiveness is examined after the fact through actual export performance, which can be measured by the average growth rates of aggregate exports and manufacturing exports. Export growth is a commonly used measure of international competitiveness among developing countries because the data are readily available and easy to collect. In table 5.2, these data are calculated for eight African countries, including Mauritius, and four Asian countries for the period 1984–95. If we measure competitive advantage by the growth rate of aggregate exports, Mauritius was less competitive than were Thailand and Tunisia. If we look at the growth rate of manufacturing exports, we conclude that Mauritius lagged behind all the Southeast Asian countries included in the sample, namely, Indonesia, Malaysia, and Thailand.

EFFECT OF COMPETITIVENESS ON EXPORT GROWTH. In a study of the export performance of some sub-Saharan African countries, Gros, Letilly, and Martinet (2002) attempted to decompose the growth of exports of a sample of African countries for the period 1991–99. The decomposition was done such that the main factors affecting export growth in those countries were assumed to be the level of world demand, the extent of trade specialization, and the degree of competitive advantage. In other words, export growth was dependent on the world demand effect, the trade specialization effect, and the competitive advantage effect. The effect of competitive advantage determined the extent to which the country was able to increase its share of the world market in its overall exports by doing better than its competitors. Hence, this effect considered both the country's export diversification effort and its ability to maintain its comparative advantage in traditional markets. The results of the study are presented in table 5.3.

The Gros, Letilly, and Martinet (2002) study showed that, over the period, the comparative advantage effect for Mauritius was negative, implying a loss of competitiveness for the country's exports. That finding was explained by the rise in the general level of remuneration in the

Table 5.2. *Average Growth Rates of Aggregate Exports and Manufacturing Exports, Selected Countries, 1984–95*

Country	Variables	Aggregte exports (US$ millions)	Mfg. exports (US$ millions)	Share of total exports in GDP (%)	Share of mfg. exports in GDP (%)
Burkina Faso	1994/95 average (US$ millions)	274.95	45.90	13.10	2.19
	Average annual growth rate 1984–95 (%)	8.56	18.99	1.27	9.46
Côte d'Ivoire	1994/95 average (US$ millions)	3,699.85	494.59	42.02	5.65
	Average annual growth rate 1984–95 (%)	3.22	8.20	0.34	4.7
Kenya	1994/95 average (US$ millions)	2,815.06	432.17	36.08	6.5
	Average annual growth rate 1984–95 (%)	6.07	12.62	3.60	14.09
Mauritius	1994/95 average (US$ millions)	2,179.55	1,013.45	58.41	27.18
	Average annual growth rate 1984-95 (%)	15.96	22.76	2.01	7.67
South Africa	1994/95 average(US$ millions)	31,122.29	11,018.56	24.34	8.6
	Average annual growth rate 1984–95 (%)	5.46	12.42	0.16	8.07
Tanzania	1994/95 average (US$ millions)	898.37	45.87	19.51	1.31
	Average annual growth rate 1984–95 (%)	15.04	3.00	16.55	10.59
Tunisia	1994/95 average(US$ millions)	3,475.29	3,910.92	44.76	23.19
	Average annual growth rate 1984–95 (%)	18.06	18.06	3.14	9.87
Zimbabwe	1994/95 average (US$ millions)	2,677.20	615.66	26.35	9.88
	Average annual growth rate 1984–95 (%)	7.86	431	4.57	4.76
Indonesia	1994/95 average (US$ millions)	49,849.55	21,825.38	26.37	11.55
	Average annual growth rate 1984–95 (%)	8.65	24.34	0.41	15.75
Korea, Rep. of	1994/95 average (US$ millions)	132,762.61	101,757.8	31.58	24.23
	Average annual growth rate 1984–95 (%)	15.61	14.68	–0.47	–1.27
Malaysia	1994/95 average (US$ millions)	72,462.51	49,200.77	92.59	62.89
	Average annual growth rate 1984–95 (%)	15.13	26.36	5.36	16.11
Thailand	1994/95 average (US$ millions)	62,558.62	36,892.33	40.05	23.63
	Average annual growth rate 1984–95 (%)	20.78	29.93	6.14	14.30

Source: Elbadawi and Randa 1999.
Note: GDP = gross domestic product; mfg. = manufacturing.

economy as a result of a labor shortage in the EPZ sector. Among the sub-Saharan countries included in the study, Senegal and Nigeria also lost competitiveness, whereas Madagascar, Ghana, South Africa, and Côte d'Ivoire gained in competitiveness.

MULTIFACTORAL APPROACH: THE GROWTH COMPETITIVENESS INDEX. Because of the various limitations of common measures of international competitiveness, broader composite competitiveness indicators have gained much popularity recently. In its annual *Global Competitiveness Report,* the World Economic Forum identifies the main factors affecting competitiveness as the quality of macroeconomic environment, the quality of public institutions, and the degree to

Table 5.3. *Decomposition of Export Growth, 1991–99*
Percent

Country	Change in level of exports (0)	Relative trade performances (0) – (1)	World demand effect (1)	Trade specialization effect (2)	Competitive advantage effect (residual) (3)
Madagascar	109.4	50.8	58.6	–21.4	72.2
Ghana	79.8	21.2	58.6	–13.2	34.4
South Africa	58.9	0.3	58.6	–31.3	31.6
Côte d'Ivoire	46.2	–12.4	58.6	–17.2	4.8
Mauritius	36.3	–22.3	58.6	2.3	–24.6
Sub-Saharan Africa	14.9	–43.7	58.6	–38.8	–4.9
Senegal	–6.2	–64.8	58.6	–48.3	–16.5
Nigeria	–18.1	–77.6	58.6	–49.9	–26.8

Source: Gros, Lettily, and Martinet 2002.

which technology is used. Employing nearly 300 variables, the Forum analyzes and ranks the ability of countries to provide an environment in which enterprises can compete. Using indexes of technological innovation, financial system efficiency, and the degree to which the country's economy is integrated with the rest of the world (factors that contribute to a high rate of growth in per capita GDP), the Forum's Growth Competitiveness Index (GCI) for 2002 ranked Mauritius 41st in a group of 80 countries. Among 22 African countries included in the GCI, Mauritius was ranked fourth, behind Botswana, Tunisia, and South Africa. The country's GCI ranking for 2003 was 46th of 102 countries, thus indicating a decline in overall competitiveness. The GCI rankings for Mauritius for 2002 and 2003 are shown in table 5A.3.

International Competitive Pressures

Mauritius is losing its competitiveness, both over time and relative to its main rivals. This problem is compounded by new challenges at the regional and international levels. These challenges are related to the threat of imminent loss of the economy's preferential markets. It should be noted that preferential access to markets (namely, the nonreciprocal trade treatment of Mauritian products in EU and U.S. markets) played a significant role in Mauritius's economic success.

Cotonou Agreement

The Cotonou Agreement was enacted to replace the nonreciprocal preferential regime that had been granted by the EU to all African, Caribbean, and Pacific (ACP) countries with reciprocal, WTO-compatible trade regimes between the EU and non–least-developed ACP countries. The ACP countries would proceed either as regional groups, individually, or in any other alternative trade arrangements that would be defined. In 2000, the EU requested a derogation from other WTO members, thus enabling it to maintain existing trade preferences until 2008.

The new Cotonou Agreement makes provision for nonreciprocal trade preferences for ACP products until 2008. However, with the decision of the EU to grant free access to its market to all products from least-developed countries, Mauritian products have been facing more competition. This competition will increase in 2008 when the Cotonou Agreement on nonreciprocal trade preferences ends, leading to the entry into force of any economic partnership agreements that will be concluded. Negotiations on the economic partnership agreement between the EU and interested ACP states, subregions, or regions most likely will tend toward the emergence of additional free trade areas.

World Trade Organization

Globalization and trade liberalization have changed the way the world trades. The WTO has made three major changes to the rules of world trade: First, it began the process of opening up the most protected industries, agriculture and textiles. Second, it has extended the scope of international trade rules to cover services as well as goods. Third, it has created a new system for settling disputes by which decisions can be blocked only by a consensus of WTO members.

Pressures at the WTO for substantive progressive liberalization of trade in agriculture have increased significantly. This adversely affected Mauritius as an exporter of sugar under the Sugar Protocol. The Multifiber Agreement phased out at the end of 2004. As a consequence, the Mauritian textile industry started to face serious competition on the EU market from non–least-developed countries. China's entry in the WTO alarmed the world, and Mauritius was very much concerned because it would be extremely difficult to compete in textile products against China, a low-wage economy. China's exports were fueled very rapidly with the country's entry in the WTO.

Policy Recommendations

Policy Orientation

Improving export competitiveness is an important consideration for policy makers when promoting development. Competitive exports enable countries to earn more foreign exchange and so to import the products, services, and technologies they need to raise their productivity and living standards. Greater competitiveness also enables countries to diversify away from dependence on a few primary commodity exports and to move up the skills and technology ladder—all of which is essential for increasing local value added and for sustaining rising wages. Increased competitiveness enables a country to realize greater economies of scale and scope by offering larger and more diverse markets. Competitiveness in industries, therefore, can provide substantial leverage for economic growth, particularly for small nations like Mauritius, where competitiveness can enable firms to overcome the limitations of their small home markets to achieve their maximum potential.

For all these reasons, it is necessary to increase the competitiveness of Mauritian exports. The country's competitive advantage relative to its market rivals could rise in the presence of some combination of the following conditions:

- Mauritian wages decrease relative to wages in competitor countries.
- The Mauritian rupee depreciates relative to the currency in competitor countries.
- Labor productivity in Mauritius increases relative to labor productivity in competitor economies.

On which condition(s) should Mauritius focus in an effort to raise its export competitiveness? Concerning the pressure for decreases in wage rates, we find that wages are downwardly rigid: institutional factors make it difficult for wages to fall, despite this underlying pressure. The current wage determination system in Mauritius is quite complex, fragmented, uncoordinated, and rigid. There is no coordination among the key wage-determining organizations. The minimum wage system in Mauritius is complex, consisting of approximately 460 different rates. Market forces are visibly absent from the wage determination system, and the country does not have a well-developed system of collective bargaining. A complete reform of the wage setting mechanism is needed. However, because such reform tends to be a lengthy process, it may not be an appropriate strategy for raising the country's level of competitiveness.

As for currency depreciation, it certainly tends to improve international competitiveness by reducing labor costs relative to labor productivity. Given labor market rigidities, exchange rate changes can be a more feasible and effective way to alter relative unit labor costs than are nom-

inal wage reductions. Since its first devaluation in 1979, however, the country has, been making extensive use of currency depreciation. It devalued the Mauritian rupee twice (in 1979 and 1981), adopted a managed exchange rate policy, and fully liberalized its foreign exchange market. Despite the central bank's mid-1980s efforts in exchange policy management and foreign exchange liberalization, Mauritian exports experienced a declining competitiveness trend. This decline does not imply that exchange rate policies were not effective for Mauritius, but their effectiveness was reduced by uncompetitive pressures in the labor market, namely, increases in unit labor costs in the EPZ sector that resulted from an acute shortage of labor. It is important to have some degree of exchange rate flexibility.

At the same time, the exchange rate should be held fairly stable for several reasons. Although a depreciation of the Mauritian rupee may boost the competitiveness of certain sectors (for example, tourism), it also increases the costs of imported goods and services in Mauritian currency units. For enterprises with a high percentage of imported inputs, the costs of production increase significantly. Furthermore, depreciation increases the value of foreign debt denominated in Mauritian rupees. The variability in the depreciation of the nominal exchange rate creates uncertainty in the business environment and adds to transaction costs. Hence, there is a need to stabilize the exchange rate, and there is limited scope to have recourse to depreciation as a means to become more competitive.

The most appropriate way to increase export competitiveness in Mauritius is to raise labor productivity. This is true for the following reasons. First, a number of measures can be taken to raise productivity at the enterprise, sector, and national levels. (Measures applicable to Mauritius, taking into account its 2000–02 stage of development, are discussed in the next section.) Second, some of those measures can be effective in the short term, others in the medium term, and still others over the long run. Therefore, the instruments chosen can be tailored to the time frame desired for an improvement in competitiveness. Third, increasing productivity will act directly on production costs. All things being equal, a rise in labor productivity automatically implies an increase in competitiveness if we measure competitiveness by unit labor cost.

Among the three policies outlined above, the most sustainable and desirable way to become more competitive is to raise labor productivity because doing so raises the standard of living. Currency devaluation and wage reductions lower the standard.

Policy Measures to Increase Export Productivity and Competitiveness

In this section we will look at macroeconomic stability, human resource development, reduced transaction costs, infrastructure development, export diversification, quality improvement, and upgrades in technology as means of improving Mauritian productivity and ability to compete in the marketplace.

MACROECONOMIC STABILITY. An important first element in a policy mix aimed at improving productivity and competitiveness is the need to maintain macroeconomic stability in Mauritius. A stable, predictable macroeconomic environment is indispensable for improved export competitiveness, but the situation is asymmetric: macroeconomic stability cannot ensure competitiveness, and macroeconomic instability inevitably hurts competitiveness. Stability creates a business environment free of uncertainty and unanticipated costs. A stable macroeconomic environment would entail low rates of inflation, low interest rates for loans, low exchange rate variations, a reduced debt service ratio, a low budget deficit as a percent of GDP, and balance of payments stability.

In Mauritius, great efforts have been made to lower the rate of inflation to a reasonable level. The country's inflation rate in 2003 was 3.9 percent, compared with 6.4 percent in 2002. For fiscal 2002/03, the Mauritian authorities adopted an expansionary monetary policy stance to increase the level of investment in the country. Interest rates were reduced significantly. Low in-

terest rates are a main source of competitiveness for Mauritian enterprises because they lower production costs. The country's nominal exchange rate has tended toward a general increase over the past decade and that has promoted exports. As was discussed above, currency depreciation tends to increase the cost of imported goods and to increase foreign debt contracted in Mauritian rupees. That explains the need for stabilization of the exchange rate.

In summary, Mauritius's current monetary policy should take into account the following measures that tend to ensure export growth:

- *Inflation:* the need to maintain a low rate of inflation
- *Interest rate:* the importance of having low interest rates and the need to follow international trends in determining interest rate levels
- *Exchange rate:* the need to allow some degree of exchange rate flexibility while ensuring exchange rate stabilization.

HUMAN RESOURCE SKILL DEVELOPMENT. A second area of policy focus is the area of human resources development through training in new skills. In a dynamic business environment, enterprises need to stay competitive by boosting the productivity of their workforce through retraining. In Mauritius, some efforts were made in this direction. The Industrial and Vocational Training Board and the Export Processing Zone Development Authority were set up with a view to increasing the skills and knowledge of the labor force. Although the former entity is more diversified in its fields of training in specific trades, the latter entity focuses on skill acquisition for EPZ employees and provides other services (such as consultancy) that accompany training to raise the level of enterprise productivity.

The government should be more aggressive in its training policy to meet the challenges of the new world economic order. A survey on training (Lall and Wignaraja 1998) conducted by the Ministry of Labor provided valuable insight into some of the specific skill needs in the Mauritian textiles and garments industries (table 5.4). The skills relate to specialization in technical fields, updated and efficient management techniques, and the ability to adapt to technological change and increased capital intensity. In addition to those skills, such specialized support services as export credit, management of exchange risk, insurance, and shipping are important in an environment of increasing trade liberalization.

Another aspect of the human resource development process that can boost productivity and competitiveness is management development. One of the problems identified with the low level of productivity in Mauritian enterprises is the poor quality of supervisory and general management. Although a number of management institutions operate in the country, these were not very successful in cultivating the managerial expertise needed to promote productivity. Associated with the need for management development training is a need for greater organizational development aimed at promoting a high-performance culture, competent leadership, teamwork, planning, decision making, communication, and trust.

Here are several concrete measures in the field of training policy that could apply to Mauritius:

- *Creating social partnerships:* the need for close collaboration among employers, workers, and the state to determine skill needs and the most effective ways to meet them; the launch of an information campaign to educate firms about skill gaps
- *Benchmarking future skill needs:* the importance of having future surveys of skill needs benchmarked against competitor countries to identify skill gaps in potential areas of comparative advantage
- *Cofinancing:* the need to identify means to induce individuals and enterprises to finance training costs because government no longer can meet the full economic burden of training; the need to make training delivery more efficient; ideas include partial cost recovery of service approaches for turning around ineffective public sector training institutions and assistance to industry associations that launch training centers

Table 5.4. *Emerging Skill Needs in Textile and Garment Manufacturing*

Occupation	New skills needed
Knitting, dyeing, and spinning operators	Technical skills for operating and maintaining automatic and semiautomatic machines
Garment assembly operators	Multiple skills to operate different kinds of machines
Maintenance technicians	Knowledge of new machines and materials; ability to train operators
Designers and product developers	Ability to perform computer-aided design; ability to develop more imaginative designs
Pattern makers, graders, and cutters	Ability to computerize systems
Supervisors	Engineering skills for line balancing and work loading; cost and quality consciousness; team leadership skills; ability to train operators
Time-and-motion study technicians	Upgrading skills to meet market changes
Engineers	Greater productivity consciousness; ability to adapt machines to gain flexibility; ability to develop preventive maintenance program
Quality controllers	Higher levels of quality consciousness; familiarity with ISO 9000 standards and system needs
Sales executives and merchandisers	Knowledge of customer-driven, computerized information systems; ability to do market research and follow competitive trends

Sources: Commonwealth Secretariat; Lall and Wignaraja 1998.

- *Prioritizing cost effectiveness:* the need for government to prioritize its training expenditures; also involves decentralizing decision making and increasing the participation of private training providers, both of which require considerable government support and monitoring of standards.

REDUCTION IN TRANSACTION COSTS AND DEVELOPMENT OF INFRASTRUCTURE. Another policy area to increase competitiveness in Mauritius is related to the reduction of bureaucratic red tape that increases transaction costs. Beginning in the 1980s, attempts have been made to reduce bureaucratic red tape in Mauritius, including the successful implementation of the TradeNet system at customs and the establishment of the Board of Investment. Bolder measures have to be implemented, however, because bureaucratic impediments to obtaining permits and licenses and the considerable delays in project approvals hinder investment. Many institutions need to be rationalized and modernized to cope with economic globalization. The public sector reform, which began in the early 2000s, should be made more credible and should be accompanied by public sector employees' total involvement in the process.

A related area of operation is the improvement of the physical infrastructure. In 2000, Mauritius had a road density of 1.02 kilometers per square kilometer, which did not compare favorably with that of small economies like Singapore (4.71 km/sq. km.). A sharp increase in the fleet of vehicles resulted in severe congestion along the main corridors. Business activities and productivity are affected adversely by traffic congestion. Poor transportation as well as poor social services (such as health care) have been identified as factors resulting in worker absenteeism, tardiness, low motivation, and low productivity. An efficient infrastructure is needed for improved export competitiveness.

The outdated system for providing the main utilities and the resulting high prices are major drawbacks to Mauritian competitiveness. The environment for electricity and telecommunications does not compare with that of the country's market rivals. Although there has been a significant fall in the price of electricity offered to the industrial sector in many countries, electricity rates in Mauritius have been increasing continuously. In the field of telecommunications, the absence of competitive telecommunications in Mauritius is an impediment to the use of information and communications technology (ICT) applications in existing sectors, such as sugar and textiles. Table 5.5 reveals the marked deterioration of various ICT indicators in Mauritius from 1999 to 2000.

In addition, the costs of basic telephony and Internet do not compare favorably with those of comparable countries, such as Chile and Malaysia.

Overall recommendations to reduce transaction costs and to improve infrastructure in Mauritius include these:

- *Public sector reform:* the effective implementation of an appropriate public sector reform to reduce red-tape bureaucracy
- *Privatization:* the privatization of infrastructure through public-private partnerships, such as build-operate-transfer and build-operate-own-transfer schemes
- *Establishment of appropriate user charges:* cost-reflective tariff levels and structures to promote more efficient use of infrastructure services, to direct investment decisions effectively throughout the economy, and to strengthen the financial viability and accountability of infrastructure enterprises
- *Government expenditure on infrastructure:* the need for the government to invest a given percentage of GDP in new infrastructure, such as port and airport facilities, and to maintain existing infrastructure, such as roads and electricity supply
- *Pursuit of possible finance source:* consideration of the role of the African Development Bank in financing private infrastructure projects in Africa
- *Use of the regional infrastructure network:* the need to explore the possible use of the network to develop infrastructure; this could lead to cost reductions through economies of scale
- *ICT:* the need to develop ICT policies that will help Mauritius reduce transaction costs, provide opportunities to increase exports, and open up wider markets.

DIVERSIFICATION, QUALITY IMPROVEMENT, AND TECHNOLOGICAL UPGRADING. Mauritius long has specialized in industrial activities that have limited learning potential and spillover benefits. Both sugar and textiles activities involve low technology and low skills. Another policy measure to increase the productivity and competitiveness of Mauritian exports is diversification and product differentiation. Since the 1980s, Mauritius has tried to diversify its exports through the production and export of new products, such as canned food, processed fish, precious stones,

Table 5.5. Rankings in Various ICT Indicators, 1999–2000

Indicator	1999 rank[a]	2000 rank[a]
International telephone service	30	48
E-mail	32	38
E-commerce	30	56
Internet for customer service	30	54
Internet for supplier relationship	4	35

Source: World Economic Forum 2000.
Note: ICT = information and communications technology.
a. Total number of countries rated = 75.

jewelry, and leather goods. These exports, however, constitute a negligible share of GDP and have increased very slowly over time. For the diversification and product differentiation strategy to be successful, the country has to develop and move into products or activities that require a higher level of skills and produce a higher level of added value, that are associated with a higher level of quality, or that are technology based.

Mauritian authorities should focus on improving the quality of all aspects of the production process as a basis for competitiveness. Continuous improvement of product and process quality plays a leading role in successful global manufacturing as firms pursue faster product development with higher levels of product quality—all at lower cost. Standards and technical regulations are essential to trade and the diffusion of technology. Mauritian products need to demonstrate compliance with international standards and technical regulations as large buyers increasingly demand evidence of compliance with international standards. Practical measures to encourage quality improvement include the following:

- *Attention focused on quality:* increasing awareness among small and medium enterprises (SMEs) that quality in processes leads to a reduction in waste and, ultimately, to cost reductions
- *Provision of incentives:* granting tax or financial incentives to SMEs that adopt ISO 9000 quality management and total quality management practices; encouraging SMEs to improve their products and processes by the use of testing and measurement services and technical extension services
- *Clusters:* promoting the development of industrial links between SMEs and large companies through clusters that aim at improving overall competitiveness.

One of the problems associated with low productivity and the lack of competitiveness in Mauritian enterprises is the use of old technology in the production process. Therefore, another policy recommendation is to provide financial and technical support for enterprises to retool and modernize their operations. Such retooling and modernizing would involve the use of information technology and new machines and equipment in the production process, and the adoption of technological methods in the agroprocessing and agriculture sector. Upgrading existing technology is a process of moving from the slow productivity growth associated with labor-intensive or resource-intensive lines of production to high productivity growth.

Mauritius has to consider the following measures when addressing the technological upgrading of its exports:

- *Support for enterprises:* government provision of tax or financial incentives (such as loans) to SMEs to enable them to adopt new technology; also, full technical support provided to enterprises by relevant organizations, with staffing by technical experts; efforts to secure technical assistance from foreign countries and organizations, such as the Commonwealth Secretariat
- *Foreign direct investment:* attracting export-oriented foreign investment is a shortcut method for building export competitiveness through technological upgrading; domestic affiliates of multinational corporations are better placed to acquire export capabilities because of their ready access to "ownership" advantages, such as their parent corporations' technologies and marketing know-how
- *Skill supply:* an adequate supply of workers with the needed skills on which to base a shift in the production pattern
- *Control of social costs:* upgrading imposes important social costs because it involves an initial period during which resources are shifted to outputs produced at low factor productivities until the learning process takes over; because these social costs must be controlled, technological "jumps" cannot be too large.

Conclusion

Policy support probably is the most important driver of export success. In Mauritius, the National Productivity and Competitiveness Council is the coordinating body on matters of productivity and competitiveness, and it formulates strategy and monitors policy implementation. The council will be called on to play a much more active role in an economic environment characterized by fast globalization and trade liberalization.

In this report, we have shown that productivity improvement is the most appropriate strategy for making Mauritian exports more competitive in the world marketplace. Basically, productivity and competitiveness increase by ensuring a stable macroeconomic environment, investing in human resource development and skill formation, reducing transaction costs, developing infrastructure, and diversifying exports mainly through quality and technology.

Institutions will have to play a key role in promoting productivity growth and competitiveness in Mauritius. The government needs to stabilize the economy, stabilize the exchange rate, improve the industrial training system, reduce bureaucratic procedures, and provide tax incentives. The labor unions must provide responsible leadership, educate workers to be more productive, and promote the linking of wage increases with productivity improvements. Private sector organizations should encourage good management practices in enterprises, promote greater collaboration with the government, lobby for more incentives, and invest in training. International development institutions will have to consider the possibility of financing projects and programs to improve productivity and competitiveness in the country, especially in the areas of infrastructure and technical assistance.

The challenge requires that policy makers establish and maintain appropriate links and coherence among actions taken in these policy areas. A coherent, market-oriented competitiveness strategy in small states is vital to success in international markets.

Annex A: Economic Structure of Mauritius

Table 5A.1. Annual Indicators of Economic Structure, 1998–2002

Indicator	1998[a]	1999[a]	2000[a]	2001[a]	2002[b]
GDP at market prices (MUR billions)	99.9	107.4	119.5	131.8	143.5
GDP (US$ billions)	4.2	4.3	4.6	4.5	4.8
Real GDP growth (%)	5.9	3.3	8.0	5.8	2.7
Consumer price inflation (average %)	6.8	6.9	4.2	5.4	6.4
Population (millions)	1.2	1.2	1.2	1.2	1.2
Exports of goods FOB (US$ millions)	1,669.3	1,589.2	1,552.2	1,615.4	1600.8
Imports of goods FOB (US$ millions)	1,933.3	2,107.9	1,944.4	1,871.2	1,848.9
Current account balance (US$ millions)	3.3	−131.0	−36.0	246.7	204.9
Foreign-exchange reserves excluding gold (US$ millions)	559.0	731.0	897.4	835.6	1,227.4[a]
Total external debt (US$)	1.9	1.8	1.7	1.7	1.7
Debt service ratio, paid (%)	9.2	7.2	18.2	6.9	6.9
Exchange rate (average) MUR:US$	24.0	25.19	26.25	29.13	29.96[a]

Sources: Country Report: Mauritius, 2005, Economist Intelligence Unit.
Note: FOB = free on board; GDP = gross domestic product; MUR = Mauritian rupee.
a. Actual amounts.
b. Economist Intelligence Unit estimates.

Table 5A.2. *Additional Annual Indicators of Economic Structure, 1998–2002*

Origins of GDP, 2002[a]	Percent of total	Components of GDP, 2002[a]	Percent of total
Agriculture, construction, electricity	14.6	Private consumption	66.3
Manufacturing	22.4	Government consumption	8.2
Wholesale and retail trade	11.7	Gross fixed capital formation	22.0
Restaurants and hotels	6.0	Exports of goods and services	62.3
Transport and communications	13.8	Imports of goods and services	−59.0
Financial and business services	18.9	GDP at market prices	100.0
Other	12.6		
GDP at market prices	100.0		

Principal exports, FOB, 2002[a]	US$ millions	Principal imports, CIF, 2002[a]	US$ millions
EPZ products	1,118	Manufactured goods	836
Sugar and molasses	287	Machinery and transport equipment	461
		Food and beverages	387

Main destinations of exports, 2001[b]	Percent of total	Main origins of imports, 2001[b]	Percent of total
United Kingdom	28.3	France	20.2
France	23.6	South Africa	11.8
United States	17.1	India	8.9
South Africa	11.5	Hong Kong (China)	5.0

Source: EIU 2003.
Note: CIF = cost, insurance, and freight; EPZ = export processing zone; FOB = free on board; GDP = gross domestic product.
a. Official estimates.
b. Derived from partners' trade returns; subject to a wide margin of error.

Annex B: Overall Competitiveness Rankings by the World Economic Forum

Table 5A.3. *Mauritius: Overall Competitiveness Rankings*

Index	Rank	Index	Rank
Growth competitiveness		*Business competitivenes*	
Index 2003	46	Index 2003	44
Index 2003 among *GCR* 2002 countries	44	Index 2003 among *GCR* 2002 countries	43
Index 2002[a]	41	Index 2002[a]	49

Source: World Economic Forum 2004.
Note: GCR = Global Competitiveness Report.
a. Applying 2003 formula.

References

Central Statistics Office, Ministry of Finance and Economic Development, Republic of Mauritius. Various years. "Digest of Productivity and Competitiveness Statistics." http://www.gov.mu/portal/site/cso/menuitem.dee225f644ffe2aa338852f8a0208a0c/?content_id=f38f40bc3e1ac010VgnVCM1000000a04a8c0RCRD.

Downes, A., 2003. "Jamaica: Productivity and Competitiveness in the Jamaican Economy." Economic and Sector Study Series, Inter-American Development Bank, Washington, DC.

EIU (Economist Intelligence Unit). 2003. "Country Report: Mauritius, Madagascar, Seychelles." London.

Elbadawi, I. A., and J. Randa. 1999. "Can Africa Export Manufactures? The Role of Endowment, Exchange Rates and Transaction Costs." Policy Research Working Paper 2120, World Bank, Washington, DC.

Gros, J., G. Letilly, and S. Martinet. 2002. "Trade Performances of Sub-Saharan Africa: Necessary Diversification." Development, Institutions, and Long-Term Analysis Working Paper DT/2002/13.

IMF (International Monetary Fund). 2006. "Mauritius: Selected Issues and Statistical Appendix." Country Report 06/224, Washington, DC.

Krugman, P. 1994. "Competitiveness: A Dangerous Obsession." *Foreign Affairs* 73 (2).

Lall, S., and G. Wignaraja. 1998. *Mauritius: Dynamising Export Competitiveness.* Economic Paper 33. London: Commonwealth Secretariat.

OECD (Organisation for Economic Co-operation and Development). 1992. "Technology and the Economy: The Key Relationships." Photocopy. Paris.

Porter, M. E. 1990. *The Competitive Advantage of Nations.* New York: Free Press.

World Economic Forum. 2000. *Global Competitiveness Report 2000–01.* Oxford, UK: Oxford University Press.

———. 2004. *Global Competitiveness Report 2004–05.* Oxford, UK: Oxford University Press.

6

Export Performance and Economic Growth in Ethiopia

Kagnew Wolde

This report examines export performance and economic growth in Ethiopia, using a multivariate time-series approach within a production function framework. Given the significant role of the export sector in the country's economy, the study used cointegration and a vector error correction model to analyze real data for total exports, gross domestic product, imports, gross capital formation, exchange rate, and population over the period 1960/61 to 2003/04. Consistent with expectations, export growth was positively related with output growth, regardless of the specification of the export variable. The results obtained cast doubt on previous studies arguing that a positive and significant link in export and economic growth is achieved when the country studied is exporting manufactured products. Even then, this report suggests that Ethiopia should spare no effort to bring about economic transformation, to increase production, and to diversify its exports on a rapid and sustainable basis.

The performance of sub-Saharan African economies is dismal as a result of many factors: deteriorated economic growth, higher population growth, slow technological progress, a dwindling per capita income, low capital formation, low productivity, abysmal poverty, political instability, and inept economic policies. Promoting sustainable growth and instituting structural transformation are means of redressing this poor economic condition. Diversifying and promoting exports also can contribute to economic growth. Enhancing the efficiency of domestic savings and channeling them into investments in various sectors is essential.

Like other sub-Saharan African economies, the Ethiopian economy is agriculture based and relies highly on earnings from fragmented household agricultural activities. To a great extent, the performance of the economy is guided by the performance of the agricultural sector; good performance in that sector is considered better performance by the entire economy because the sector contributes about 50 percent of the gross domestic product (GDP) and 85 percent of employment opportunities.

Agricultural commodities dominate Ethiopia's export basket, supplying 80–90 percent of the merchandise export earnings. Coffee, the principal export product, generates more than half of the foreign exchange earnings, although the crop has became subject to internal and external shocks. For example, the value of coffee exported grew, on average, by 19.0 percent during the

period 1993/94 through 1997/98, and it declined by 26.9 percent in 1999/2000. The share of noncoffee exports increased remarkably over the period 1998/99 through 1999/2000 because of a drop in coffee export earnings and a rise in earnings from these new commodities being sold overseas (EEA/EEPRI 2002, pp. 27–28). The decline in the coffee share, however, does not mean that transformation was occurring; the share dwindled partly as a result of a decline in the international market price for coffee.

Other major export commodities in Ethiopia include hides and skins, chat, pulses and oilseeds, fruits, and vegetables. The share of hides and skins, the major manufactured export product, is declining despite the country having a large livestock population. Chat is becoming one of the most important sources of foreign currency earnings and is competing with coffee for land resources; some farmers are ceasing the growing of coffee to grow chat (Nega, Moges, and Gebeyehu 2002). The lack of physical and marketing infrastructure suppresses export performance and economic growth by limiting the ability of farmers to increase their earnings.

Nonagricultural exports make up a very small share of the total exports, and this implies the dearth of structural transformation. The capacity of exports is declining, which leads to higher debt levels (Nega, Moges, and Gebeyehu 2002) and suggests that the country is unable to create a dynamic and competent industrial sector.

Ethiopia's major manufacturing export commodities are leather and leather products, frozen meat, sugar, and textiles. A study of the leather industry has shown that the tanning and leather manufacturing industry runs at partial capacity because of a shortage of hides and skins coupled with poor quality standards (Gebre-Michael 2004). Ethiopia exports raw hides and skins and imports about 30 percent of the aggregate footwear supply. This fact implies a policy inconsistency in relation to the subsector. Textile manufacturing industries also run at partial capacity, largely owing to structural problems. From 1980 to 2000, Ethiopia did not succeed in increasing its manufactured exports, although the share of manufactured products in total exports for the developing countries as a whole expanded almost fourfold in that period (Gebre-Michael 2004). The industrial sector accounts for merely 12.0 percent of GDP, 22.0 percent of foreign exchange earnings, and 9.5 percent of employment opportunities. The sector is oriented primarily toward the processing of agricultural commodities, followed by petroleum refining and the production of textiles.

The Ethiopian economy has experienced three distinct growth chapters exemplified by the three regimes that ruled the country during the period 1960/61 through 2003/04. The different policy prescriptions pursued by the different regimes did not produce the required results; rather, the growth of the economy remained unsatisfactory.

The country recorded a promising growth performance during the imperial regime (1960/61–1973/74), but that growth was halted in the mid-1970s (table 6.1). In the period 1974/75–1990/91, especially, overall economic performance was gloomy and real aggregate variables decelerated. Average real GDP growth dwindled to 1.8 percent a year—a meager amount to sustain the prevailing level of per capita income. Real per capita GDP slowed by 0.84 percent while popu-

Table 6.1. *Growth Rates of Real GDP, Exports, and Real Per Capita GDP*

Regime	Fiscal years	Real GDP (%)	Real exports (%)	Real per capita GDP (%)
Imperial	1960/61 to 1973/74	3.87	8.20	1.90
Derge	1974/75 to 1990/91	1.80	4.70	−0.84
EPRDF	1991/92 to 2003/04	5.92	23.58	0.84
Average	1960/61 to 2003/04	4.21	13.04	0.41

Sources: Author's calculations, based on data from the Ethiopian Ministry of Finance and Economic Development and from the National Bank of Ethiopia.

Note: EPRDF = Ethiopian People's Revolutionary Democratic Front; GDP = gross domestic product.

lation grew at about 2.8 percent annually. The ratios of government revenue and government expenditure to GDP were 22.0 percent and 30.2 percent, respectively. This deceleration in the economy compelled the country to resort to both domestic and foreign borrowing to finance the mounting fiscal deficit. Large decelerations of per capita income were recorded in 1984/85 as a result of drought/famine. In 1990/91, such decelerations were attributed to civil war and political instability. The average growth of real GDP in the periods 1960/61–1973/74 and 1991/92–2003/04 was 3.87 percent and 5.92 percent, respectively.

In 1992, Ethiopia embarked on a reform package intended to reverse deteriorating economic conditions and to put the economy on a sustainable growth trajectory. Since that time, the government has contained spending, reduced tariffs and military expenditures, improved tax collection, reformed the investment code and the tax laws, and introduced a market-based system to allocate urban land. It has made an effort to stimulate private sector development by launching a privatization process and establishing a number of agencies to facilitate privatizing. In 2008, however, the economy remains weak and sensitive to shocks, specifically drought and commodity price instability. Real GDP skyrocketed to 7.7 percent in 2000/01, but then it staggered at a rate of 1.2 percent in fiscal year 2001/02 and constricted by about 3.8 percent in 2002/03. Following the 2002/03 drought, agricultural production value added dropped by 12.2 percent because of a 25.0 percent fall in the production of cereals, pulses, and oilseeds. Poor growth performance in 2001/02 and the fall of agricultural production in 2002/03 caused the average real GDP growth for the period 1997/98–2002/03 to decelerate to 2.5 percent.

Likewise, the overall performance of the export sector has been gloomy in the period 1960/61 through 2003/04 as a result of structural problems and policy constraints. On average, exports contributed about 14 percent to GDP during the periods under study. From 1960/61 to 1973/74, export earnings covered more than 90 percent of the country's import bills and, in some years, actually registered a surplus. This fact supports the view that diversifying exports eases foreign exchange constraints and stimulates the country's economic growth. The contribution of exports to the financing of imports has been contracting continuously over the subsequent years, reaching approximately 45.1 percent in fiscal 2001/02. In the same year, merchandise imports swelled to 11.7 percent as a result of current account liberalization and the availability of foreign resources. The country's major imported commodities include fuel, capital goods, and raw materials. The decline in export revenue, relative to the steady rise in the import bill, not only widened the balance of trade deficit but also restrained the import of essential intermediate and capital goods. The widening gap between imports and exports has exacerbated the rise of external financing in the form of aid and credit.

During the period 1960/61–2003/04, the real value of goods and services exported grew at an average rate of 13.04 percent. There was a modest growth of total export value prior to 1974; the average annual growth rate of real export value was 8.2 percent. That rate dwindled to 4.7 percent during the period 1974/75–1990/91 and went up in the period 1991/92–2003/04.

Not only is the export pattern dominated by primary commodities; there also is a market concentration of the country's exports, making the country vulnerable to the economic conditions (demand) of its trading partners. Europe remains Ethiopia's major export destination, accounting for nearly half of its total exports. Belgium, England, France, Germany, and Italy account for more than 85 percent of total exports to the European market. Export share to the Asian market has grown remarkably. For instance, the share of exports to Asia rose from 17.0 percent in 1980 to about 32.3 percent in 1997–2002. Japan and Saudi Arabia import more than 70 percent of Ethiopia's total exports to the Asian market.

The country has failed to use the African Growth and Opportunity Act, which offers duty- and quota-free access to the United States market for a wide range of manufactured products, including textiles, apparel, and leather products. Ethiopia's total export share to Africa is low, implying its failure to exploit the comparative advantage arising from geographic proximity. The country's concentration of export destinations suggests that Ethiopia has not improved its

international competitiveness and that the country is more susceptible to shocks that occur in the economies of its trading partners.

Generally speaking, the country needs to find ways to diversify and radically augment its exports on a sustainable basis. Although its economic reform program has focused on making exports an engine of growth, the government's attempts do not seem to have produced the required results. Whether exports determine GDP growth is a question that needs to be probed empirically; to the best of my knowledge, however, no such investigation has been made to test the causal connection between exports and economic growth in the Ethiopian context.

Objective, Scope, and Significance of the Study, and Organization of the Report

The objectives of this study are to examine the relationship between export performance and economic growth, using cointegration and vector error correction techniques, and to highlight possible areas of intervention to promote export diversification and growth.

The scope of the study is limited to examining the relationship between export performance and economic growth in Ethiopia for the fiscal years 1960/61–2003/04.

It is hoped that the information provided by this study will help policy makers design appropriate initiatives, and that the work will serve as a reference to subsequent research efforts in the area of export-led growth.

The report is organized as follows. The next section presents a review of relevant literature on the export-growth nexus. That review is followed by brief accounts of the export policy in Ethiopia, organized around three specific time periods. The types and sources of data and the empirical methodology used in this study are then described in detail. The study results are presented next, followed by a section of conclusions and recommendations.

Literature Review

Theoretical Literature: General Foreign Trade

According to classical economic theory, trade benefits a country by enabling it to specialize in areas of comparative advantage. To put that another way, a country engaged in trade specializes in what it does best, sells it in the international market, and imports goods that cannot easily be produced locally. Countries engaged in trade possess a surplus productive capacity that exceeds their domestic consumption requirements. A surplus productive capacity suitable for the export market appears to be a costless means of acquiring imports of new productive inputs and expanding domestic economic activity (Myint 1958). Hence, trade enables countries to benefit from their differences in factor endowments by giving them an outlet for goods that require many of the factors in which they are relatively rich.

By opening up channels of communication that would not otherwise exist with producers in other countries, trade enables countries to take advantage of spillovers in research and development—spillovers that produce indispensable benefits to developing countries (Grossman and Helpman 1991a,b; Rivera-Batiz and Romer 1991). Trade facilitates the absorption of technological improvements and global best management practices, and it opens channels of communication that stimulate learning about production methods, better terms of organization, product design, market conditions, and so forth (Ben-David and Loewy 1998; Hart 1983; Lucas 1988; Tyler 1981). As Grossman and Helpman (1991a,b) argued, technological spillovers may come through imports as easily as through exports. One species of technology transfer is the capability of developing countries to imitate the production of higher-quality goods developed in the advanced economies (Evenson and Singh 1997; Fafchamps 2000).

However, the idea that trade fosters economic growth through comparative advantage, economies of scale, and specialization was challenged in the early 1970s. Morton and Tulloch (1977) argued that because production in developing countries is highly tied with primary agri-

cultural commodities, specialization and trade do not offer the same benefits. Rather, they would cause underdeveloped economies to remain underdeveloped. As a result, industrialization strategy received particular attention.

In the 1950s and 1960s, many developing countries actively pursued an inward-looking industrialization (import-substitution) policy—a policy that called for the imposition of significant barriers to foreign trade and a substitution of domestic output for imports (using a variety of policy instruments, such as Prebisch [1950] and Singer [1950])—as a panacea to foster their economies and satisfy the domestic market. They thought that productivity would be higher in the industrial sector than in other sectors. Import substitution was believed, in the long run, to save scarce foreign currencies that would be allocated for imports of investment goods. The strategy called for shifting resources from imported goods toward domestically produced goods. The strategy also might have been useful for low-income countries with a small industrial base that exported traditional primary products. The opposite would be true for semi-industrial countries whose exports already included an increasing quantity of manufactured goods (Bhagwati 1986).

The growth experience of individual countries shed doubt on the strategy's effectiveness in the 1970s. Trade deficits widened, employment ceased to grow, and the balance of payments worsened because intermediate inputs had to be imported to supply the newly established factories (Promfret 1997). The import-substitution strategy led to a decline in the output of developing countries and to inefficiency and resource misallocation by reducing competitiveness and increasing costs. A narrow domestic market also contributed to the failure of this strategy.

Cross-country studies correlate outward-orientation with economic growth. The theoretical underpinning of outward-orientation (where a country opens its markets to the rest of the world and boosts its exports) relies on the effect of trade restrictions in reducing economic growth by distorting the pattern of resource allocation and by limiting the scope of innovation and technical progress (Edwards 1993). Under an inward-oriented strategy, scholars argue, domestic firms lose the opportunity to benefit from economies of scale and their scope of operation diminishes because they are encouraged to produce for the domestic market (Bhagwati 1988; Gwartney and Lawson 2002; Krueger 1978, 1995; Krugman and Obstfeld 2003). Foreign trade, however, not only enables domestic firms to enlarge their markets and expand through sales to the rest of the world, but also establishes new external markets and thereby produces opportunities for industrialization and fast growth. An outward-looking strategy leads to increased competition from abroad, which could lead to welfare gains by reducing the deadweight losses emanating from monopolies and oligopolies—and so produce another source of growth.

Beginning in the mid- to late-1970s, many developing countries undertook trade liberalization and pursued export-oriented strategies. Accordingly, the composition of exports from developing economies started to shift from primary commodities to manufactures and services. Trade liberalization induced economic growth by facilitating technology transfer, international integration of production, and the associated possibility of reaping scale economies, reducing price distortions, and increasing efficiency (Gebre-Michael 2004). Liberalization also could create an environment conducive to growth because inward orientation inflicts both static costs (by way of resource misallocation) and dynamic costs (by raising the incremental capital output ratios and depriving access to advanced technology).

On average, countries more open to international trade have a more rapid rate of economic growth. As Gwartney and Lawson (2002) found, the most open economies in the world had annual per capita income growth rates of 2.0 percent during the 1990s, whereas the least open ones grew merely 0.2 percent during the same period. Frankel and Romer (1999) found that a unit percentage rise in the ratio of international trade to GDP increased per capita income by at least 0.05 percent.

Other studies, in contrast, concluded that the lack of openness does not constrain economic growth in developing countries. However, counties that have positioned themselves well in terms of their overall development performance, export patterns, skilled human resource en-

dowments, and institutional and physical infrastructure would be better off with more openness than with protectionism. Birdsall (2002, quoted in Gebre-Michael [2004]) found that although many developing economies have been "open" for more than two decades, the value of their exports has remained stagnant or even declined over that period—conspicuous evidence of no growth at all since 1980. In terms of growth and poverty reduction, the performance of most natural resource production-based countries was poor, no matter how "open" they were in their trade and economic policies. The experience of countries that succeeded in developing domestic industries also shows that import substitution and policies for enhancing exports and better integrating with the rest of the world complement each other. An appropriate government policy conducive to nurturing competitive industries and upgrading technologies in existing industries (such as policies that encourage supply links between domestic firms and subsidiaries of multinational corporations) is a critical factor for the industrial sector in developing countries to achieve this dual role (Wade 2002, quoted in Gebre-Michael [2004]).

Theoretical Literature: Specific Exports

Whether export is an engine of economic growth has been a contentious issue in the growth literature for various reasons (see, for example, Buffie 1992; Jaffee 1985; Keesing 1967; Riezman, Whiteman, and Summers 1996), and there are scholars who support import-substitution strategy to foster development (Prebisch 1950; Singer 1950). Proponents of the export-led growth theory argue for the existence of a strong correlation between exports and economic growth; they believe that the export sector plays a key role in enhancing overall economic performance. Export expansion fosters higher total factor productivity growth (Krueger 1978; Ram 1987) and better use of resources by offering the potential for economies of scale (Helpman and Krugman 1985; Sharma and Panagiotidis 2004). If there were incentives to increase investment and improve technology, it would imply a productivity differential in favor of the export sector. Thus, an expansion of exports, even at the cost of other sectors, will have a net positive effect on the rest of the economy (Sharma and Panagiotidis 2004).

Exports may benefit economic growth by generating positive externalities on nonexports (Feder 1983), bringing about technological progress through foreign competition (Kavoussi 1984; Moschos 1987), improved allocative efficiency, and better ability to generate dynamic comparative advantage (Sharma and Panagiotidis 2004). The study by Balassa (1978) supported the positive external benefits of exports (greater capacity utilization, incentives for technological improvement, and management that is more efficient) attributed to the competitive pressures of foreign markets. Exports ease foreign exchange constraints to allow the import of high-quality intermediate inputs for domestic production and exports (Chenery and Strout 1966), and thereby can provide greater access to international markets, thus expanding the economy's production possibilities (McKinnon 1964).

According to Esfahani (1991), export enables developing countries to relieve the import shortage they may face—that is, revenue from exports fill the "foreign exchange gap" that is perceived as a barrier to growth. Export growth also may enhance efficiency and thus lead to an increase in real output (Jung and Marshall 1985).

As depicted in figure 6.1, all things being equal, an increase of exports will trigger a rise of income, which may lead in turn to

1. A rise in consumption because households are richer. Consumption growth, in turn, implies an increase of income (Keynesian multiplier).
2. A rise in employment because more production requires more labor.
3. An increase in household savings.
4. A widening tax base that aids the government by increasing tax revenue. At normal levels of public expenditure, this means a reduced deficit or even a surplus for the government budget.

Figure 6.1. *Export-Income Link*
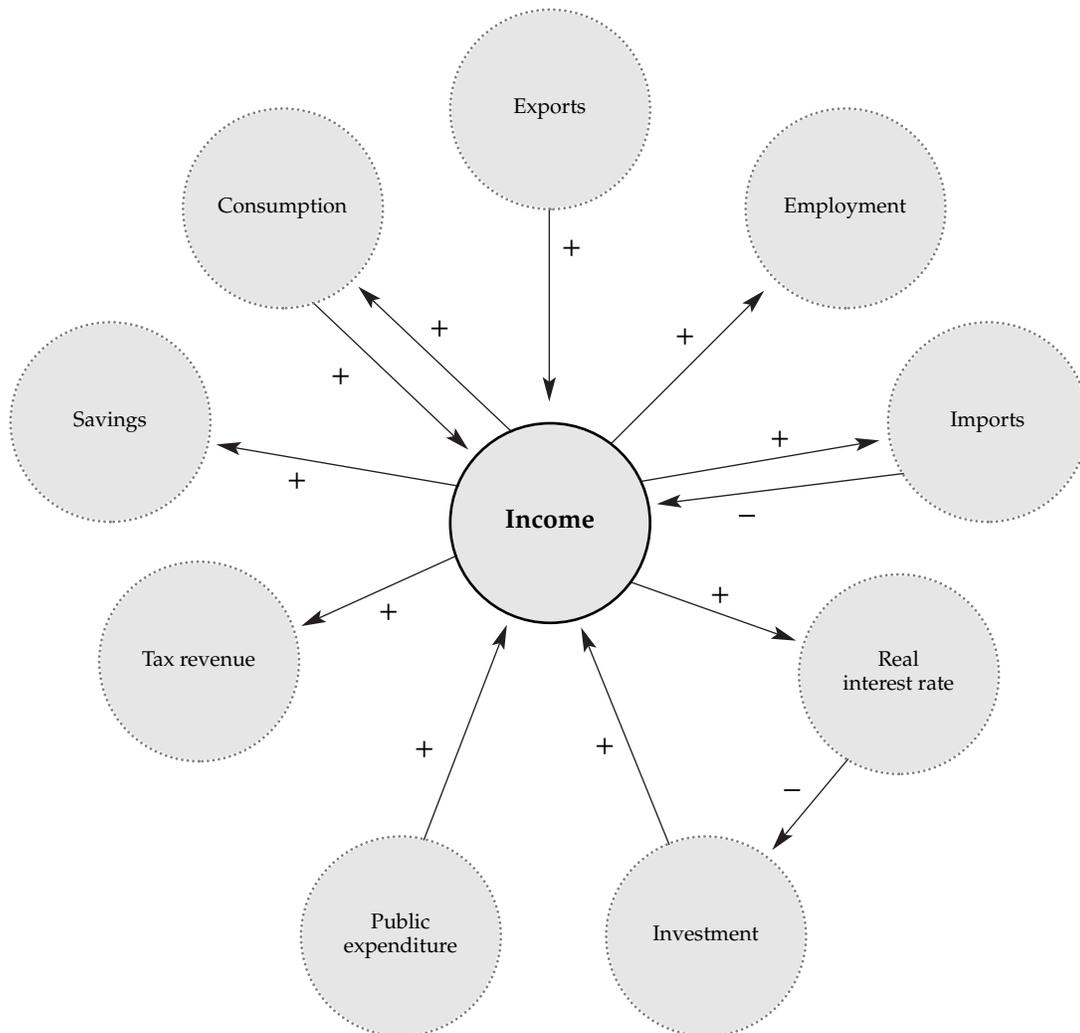
Source: Author's adaptation.

5. An increase in imports.
6. An increase in real interest rates, given a fixed real money supply, which depends in turn on the central bank deliberately choosing not to increase the nominal money supply.

Empirical Studies

A series of empirical studies has been conducted to investigate the effect of export growth on economic growth. Results were mixed. Earlier studies validated the export-led growth hypothesis on the basis of a high correlation between the export and income variables. More recent empirical works emphasizing the direction of causality between export and economic growth have produced results that are mixed and even contradictory (Giles and Williams 2000). Some researchers discovered a significant link between export and economic growth, and others refuted the hypothesis. Many of the studies conducted in the 1990s found no long-term relationship between exports and economic growth; rather, they found that the link came only from a positive short-run relationship between variables. (See Giles and Williams [2000] for a list of studies, including Ahmad and Harnhirun [1992], Oxley [1993], and Rashid [1995].)

Similarly, the methods used in various studies differ. Earlier works used bivariate correlation (the Spearman rank correlation test) in a cross-country format to test for the export-led growth hypothesis (Heller and Porter 1978; Kravis 1970; Lussier 1993; Michaely 1977). Other investigators explained the relationship within a neoclassical framework. In most of those studies (Balassa 1985; Ram 1987; Tyler 1981), export was included in an ad hoc manner in the production function to take account of a broad measure of externalities and productivity gains generated by the sector that fosters the domestic economy. The majority of these studies used the ordinary least squares (OLS) technique on cross-section data and used their results to support the outward-looking strategy against an import-substitution strategy. Other researchers used the Granger causality approach (Ahmad and Kwan 1991; Chow 1987; Hsiao 1987) and error correction methods (Bahmani-Oskooee and Alse 1993; Hachicha 2003; Michael 2002; Thungswan and Thompson 2002) to investigate the link between exports and economic growth.

Michaely (1977) used a cross-section data set for a sample of 41 countries, applied the Spearman rank correlation coefficient, and found a positive and significant relationship between exports and economic growth among the more developed economies, but not among the least developed ones. He concluded that export performance affects output growth when countries attain some minimum level of development. Balassa (1978, 1985) found a positive correlation coefficient between export expansion and output, using the data from 11 and 43 developing countries, respectively.

Tyler (1981), taking a sample of 55 middle-income economies, found a positive and significant relationship between export and income growth. Feder (1983) developed an analytical framework to test the export-growth relationship for 31 semi-industrial, less-developed countries, using the following variables: investment as a share of income, rate of growth of the labor force, and rate of growth of exports (times exports as a share of GDP). He incorporated the possibility that the marginal factor productivities are not equal in the export and nonexport sectors of the economy. The regression coefficient of the export variable was statistically highly significant. This finding led him strongly to support the hypothesis that marginal factor productivities are higher in the export sector than in the nonexport sector.

Kavoussi (1984) considered 73 middle- and low-income developing countries and found a strong effect of export growth on output growth in both sets of countries. The effects, however, tended to diminish according to the level of development. Esfahani (1991) used a sample of 31 semi-industrial countries and employed a simultaneous equation model to deal with the simultaneity problem between GDP and export growth. He found that the economic growth of most of the sample countries was largely the result of the import supply effects of exports.

Country-specific studies are quite scarce. More recent studies have used time-series data from specific countries because pooling different countries may give rise to a misleading conclusion. The results from cross-section data based on bivariate models or an ad hoc aggregate production function generally agreed on the positive association between export expansion and economic growth. However, empirical results obtained from country-specific studies strongly differed between countries and periods studied (Shan and Sun 1998). Such a disparity may imply that although cross-section studies are empirically attractive for researchers, the researchers could observe intercountry differences and so sacrifice revealing information about the behavior of many countries (Medina-Smith 2001). Cross-section studies fail to provide useful country-specific information to policy makers in developing countries, and the results are subject to dispute because of their limited sample sizes. Even those studies with larger samples were limited to specific types of developing countries (most of the researchers choose middle-income countries and oil exporters) (Medina-Smith 2001).

In a country-specific study using a sample of 73 low- and middle-income, less-developed countries, Ram (1985) found a positive and significant export-growth link and suggested the existence of a threshold effect. Ram (1987) considered a sample of 88 low- and middle-income countries, using an OLS and production function econometric technique to study a cross-section data

set of two subperiods. The results support the export-led growth hypothesis. He asserted that the huge intercountry differences and diversity suggest caution when interpreting the results.

Lussier (1993) employed cross-section and panel data analysis to establish the direction of causality between exports and real output growth, taking samples of 24 and 19 African countries. The results supported the hypothesis for panel data, but failed to find any positive link when using export growth as a share of GDP. Bahmian-Oskooee and Alse (1994) undertook causality tests on nine developing countries. In contrast to earlier studies, after incorporating in the analysis the cointegrating properties of the variables considered, they found that bidirectional causality between export growth and output growth received strong empirical support in almost all countries.

Thornton (1996) used Engle-Granger cointegration and Granger causality tests in a two-variable framework and found a positive and significant causal relationship running from exports to economic growth in the case of Mexico. Amoateng and Amoako-Adu (1996) ran causality tests for 35 African countries by introducing foreign debt service as a third variable within a trivariate causality analysis of exports and economic growth. Their results showed a joint feedback effect between export revenue, external debt service, and economic growth. The study of Doraisami (1996) strongly supported bidirectional causality between exports and growth in Malaysia.

Al-Yousif (1997) employed time-series analysis for four Arab Gulf countries, and the results supported the hypothesis in the short-run but failed to find a long-run relationship (that is, did not find cointegration). Begum and Shamsuddin (1998) conducted a study of Bangladesh, and their results indicated that exports could induce economic growth. Shan and Sun (1998) established a vector autoregressive model in the production function context in a study of China. Finding a bidirectional relationship, they rejected the unidirectional export-led growth hypothesis. Nonetheless, they did find that both exports and industrial output contribute positively to each other in China.

Chang et al. (2000) used multivariate causality analysis incorporating imports as a factor in the relationship between exports and output in their study of Taiwan (China). They found no support for the export-led growth hypothesis during the period of rapid growth there (1971–95).

Nidugala (2001), using an augmented production function with export as the regressor in a study of India, found a significant positive impact of export growth on output growth. The results further revealed that the growth of manufactured exports had a significant positive relationship with output growth, whereas growth of primary exports had no such influence.

Michael (2002) examined the relationship between exports, imports, and income in the economy of Trinidad and Tobago, using Granger causality and error correction modeling. His analysis confirmed that incomes in Trinidad and Tobago are Granger-caused by the growth of exports. A boom in petroleum exports caused increased income and spending in the nontradable sector of the economy. The results further indicated a bidirectional causality between exports and imports, a long-term bidirectional causality between imports and GDP, and unidirectional Granger causation from exports to GDP.

Thungswan and Thompson (2002) examined the causality between exports and income in Thailand between 1969 and 1995, using cointegration and error correction models. Their results clearly supported the export-led growth hypothesis for agricultural exports. For manufacturing exports, they found evidence of bidirectional causality supporting both export-led growth and the growth-driven export hypothesis; manufacturing exports had a slightly stronger effect on absorption than did agricultural exports.

Alam (2003) examined the export-led growth hypothesis in a production function framework focused on Mexico and Brazil, but found no evidence to support it. Imported capital goods appeared to be very significant in the aggregate production function analysis, implying that an increase in manufactured exports did play an important role in paying for the imports of capital goods by relaxing the foreign exchange constraint.

Keong, Yusop, and Liew (2003) ran a vector autoregressive model and multivariate cointegration for Malaysia and found a long-run association between the variables considered. The results of the error correction model revealed that all variables, except exchange rate, Granger-caused economic growth in the short run, and that led them to confirm the validity of the export-led growth hypothesis in Malaysia, both in the short run and over the long term.

Export Policy in Ethiopia

The governments that have ruled Ethiopia since 1960 have implemented different policies to boost the export sector and to encourage nontraditional exports. The development strategies and policies implemented during the pre-1991/92 periods were inward oriented, and that orientation negatively affected the competitiveness of the export sector. The Ethiopian People's Revolutionary Democratic Front, which overthrew the Derge regime and came to power in 1991/92, has undertaken a package of reforms. The state liberalized the exchange and trading system to promote exports through diversification. A succinct review of the policies of the different regimes follows.

Periods before 1974/75

Import substitution was a dominant strategy prior to 1974/75. The private sector, mainly foreign capital, had occupied the largest share of both export and import activities. The development plan had three phases (Imperial Government of Ethiopia 1955, 1962, 1968):

1. *The first five-year development plan (1957/58 to 1961/62):* Import substitution, industrial promotion, and infrastructure such as road development were the focus of this plan; export promotion received only meager attention. It was acknowledged that the volume of exports, the balance of payments position, and the level of budgetary revenue depended on the price movements and the extent of demand for coffee, hides and skins, and oilseeds. The plan envisioned export diversification by exploiting the large livestock population and the products of agroprocessing industries to secure an average annual export growth of 9 percent.

2. *The second five-year development plan (1962/63 to 1966/67):* Structural change and export diversification were made a priority for generating a higher level of foreign exchange earnings. New export products of industrial origins and mining products were supposed to play a significant role. The plan set the share of agricultural exports to be reduced to 72.3 percent in 1966/67 (from 93.6 percent in 1962/63), and the share of manufactured products to be increased to 24.2 percent (from 5.2 percent). The incentives offered to investors engaged in the production of nontraditional exports included profit/income tax holidays, simplification of export trade licensing, and restructuring and strengthening of the chamber of commerce. The average annual export growth rate was expected to reach 11 percent. The major policies devised in this period were establishing government foreign trade corporations; revising existing customs tariffs to protect domestic products and stimulate exports; directing credit, premium, and subsidy policies toward the development of production and promotion of exports; and concluding a series of bilateral and multilateral economic agreements.

3. *The third five-year development plan (1968/69 to 1973/74):* Geographic diversification of traditional export products (coffee, livestock products, and oilseeds) and the development of nonagricultural exports were the focus of this period. The plan envisioned reducing the share of traditional exports from 86 percent in 1967/68 to 75 percent in 1973/74 and the share of coffee from 55 percent to 40 percent in the same period, partly as a result of adding new export products. The measures adopted included overvaluation of the ex-

change rate, high tariff rates, wide-ranging foreign exchange control, and nontariff barriers such as restrictions on some items and heavy tax on exports. The expected export diversification did not happen because of structural problems the economy encountered.

The Derge Regime, 1974/75–1990/91

In this period, there was restricted participation and involvement of the private sector. The overall policies of the military regime favored the expansion of collective and public enterprises, whereas private enterprises were marginalized and their participation in the country's development efforts was kept to a minimum. The economy was managed through central planning. An inward-looking strategy behind highly protective tariffs and quantitative restrictions was the development strategy of the day.

The government undertook a 10-year perspective plan (1985/86 to 1994/95) with the aims of orienting the country's export structures toward high-value-added products instead of the traditional exports and of increasing the volume and composition of manufactured exports, expanding the foreign exchange earnings, and increasing the socialization of the export sector. However, particular attention was given to state-owned export companies, no matter their inefficiency. The perspective plan also placed greater emphasis on geographic diversification of exports toward the markets of socialist countries and neighboring African countries. The average annual export growth rate was targeted at 15.4 percent, and state-owned export companies were expected to occupy 90 percent of the export business.

The government planned to reduce the share of traditional exports (coffee, hides and skins, pulses and oilseeds) to 53.2 percent in 1994/95 (from 73.5 percent in 1985/86). The share of other exportables (live animals, meat products, fruits and vegetables, spices, sugar and molasses, natural gum, chat, and others) was targeted to rise from 26.5 percent in 1985/86 to 46.8 percent in 1994/95. New exports, such as copper, potash, marble, soda ash, cement, ceramics, and leather products, were to be placed in the international market in the second half of the perspective plan.

A number of tools were used to fulfill these objectives, including provision of favorable tax, tariffs, and foreign exchange rate measures; improvement of export quality, quantity, and diversity; and dissemination of current information on world market prices and other factors to exporters and producers. Although an export subsidy plan was introduced in 1983/84, with the aim of counterbalancing the negative effects of distortionary policies and thereby securing export growth, it was not sufficient to neutralize the prevailing anti-export bias incentive structure. The other effort considered relevant for export diversification was the 1989/90 directive banning the export of raw hides and skins.

Periods after 1990/91

The current ruling party, the Ethiopian People's Revolutionary Democratic Front, overthrew the military junta in 1991. It devised a new economic policy framework with the aim of reversing deteriorating economic conditions and reorienting the economy from one that is centrally planned to a free market economy. Outward orientation has been the development strategy and, to this end, a number of reform packages were undertaken and continue to operate.

Since 1992, under the support and guidance of the International Monetary Fund and the World Bank, Ethiopia has undergone liberalization and enhanced structural adjustment programs to restrain internal and external imbalances of the economy. One of the basic tasks of the new policy regime is to continue opening the economy to foreign competition with a view to benefiting from expanded markets.

The aim of the external sector policy reform was to diversify the country's export base to ease foreign currency shortages along a free market-based economic path. To achieve this objec-

tive, the government not only has minimized its role in the external sector but also has ensured adequate private capital participation in the export business. The tools implemented include devaluation of the birr and a step-by-step liberalization of the foreign exchange market, streamlining the import and export licensing system, reducing tariffs and offering fiscal incentives to exporters, abolishing taxes on exports and subsidies to parastatal exporting enterprises, encouraging export-oriented investment, introducing duty drawback and foreign exchange retention schemes, and minimizing administrative and bureaucratic procedures.

The government also has promulgated an export development strategy and established export support institutions. It has implemented export-specific incentive schemes aimed at diversifying the country's export products by changing the structure of the subsector in particular and the whole economy in general (Ministry of Trade and Industry 1998). A brief review of these measures is presented here.

THE EXPORT DEVELOPMENT STRATEGY. The major objectives of the export development strategy are sustaining the growth of agricultural production, generating foreign exchange, and promoting internationally competitive industry. The document has recognized the complexity of shunning heavy reliance on agricultural products within a short period of time and has underlined the strategic importance of giving due concern to the export of coffee, cotton, fruits and vegetables, and livestock and livestock products, partly because these products have wider and stable foreign markets. Because a sustainable market for primary products calls for their supply in manufactured form, the strategy document emphasized textile, leather, meat, and other agroindustries with greater employment-generating potential and easy entry.

EXPORT SUPPORT INSTITUTIONS. The government has recognized the importance of establishing appropriate export promotion services and the institutions to provide them. The first step taken was to establish the Ethiopian Export Promotion Agency, aimed at the design and coordination of the overall export promotion effort and at proper and most efficient use of existing capacity. The agency was created to provide comprehensive support services and incentives to exporters, including timely market information, priority in receipt of credit, working premises, and warehouses. The Ethiopian Trade Point, set up under the agency, is a source of trade-related information on businesses and market opportunities, potential clients and suppliers, and trade regulations and requirements.

The Animal Products Marketing Agency was established to work on developing the livestock sector. The Leather and Leather Products Technology Institute was put in place to promote the production and export of the leather industry.

EXPORT INCENTIVE SCHEMES. The following export incentive schemes were introduced with a view to encouraging domestic exporters to compete in an increasingly competitive world market:

- *Foreign Exchange Retention Scheme:* Under this plan, eligible exporters of goods and services and recipients of inward remittances are allowed to benefit from the foreign exchange retention facility. The foreign exchange surrender requirement was eliminated and replaced by a conversion requirement permitting the use of foreign exchange proceeds for current account transactions within four weeks. Exporters are able to sell their foreign exchange receipts (90 percent of total proceeds) to any bank or Forex bureau at freely negotiated rates over the conversion period, holding the 10 percent in Retention Account A indefinitely. They are allowed to deposit the remaining 90 percent in Retention Account B for a maximum of 28 days; after that, commercial banks are obliged to convert the balance in Retention Account B for their own account and pay the birr equivalent to the customer, using the applicable interbank rate for the day. The balances in Retention Accounts A and B can be used for import of goods and services, export promotion, payment of advertising and marketing expenses, subscription to business publications, train-

ing and educational expenses, settlement of external loans, and payments of supplies credits (see National Bank of Ethiopia [1998] for details).

- *Export Trade Duty Incentive Schemes:* The following plans were put in place to support the export sector:

  ○ *Duty Drawback Scheme:* This program is made operational on a deferred payment basis, allowing exporters to import inputs at world prices up front. Exporters would be refunded 100 percent of the duty, including indirect taxes, paid on raw materials used in the production of commodities upon exportation of the commodities processed. If the imported raw material is re-exported in the same condition because it does not conform to purchase order specification, is damaged, is a short delivery, or is not in market demand, the refund will be 95 percent (Proclamation No. 249/2001). Implementation of this plan is not efficient enough, however, and there is need for further improvement and simplification of its operation along with the exemption schemes.

  ○ *Voucher Scheme:* A voucher is a document with monetary value written by the Ministry of Finance and Economic Development for use as a deposit for duties and taxes payable on imported raw materials. Under this scheme, vouchers are issued by the Customs Authority to exporters who have manufacturing licenses and who fulfill the stipulated eligibility criteria. The vouchers are in the amount of taxes and duties to be paid on raw materials imported for the production of exportable products.

  ○ *Bonded Manufacturing Warehouse Scheme:* This is a duty-free importation plan that benefits exporters who are not eligible to use the voucher program. Exporters having a manufacturing license and insured warehouses that fully comply with all customs laws and regulations are allowed to import the required raw materials free of duties for use in the production of manufactured exports.

- *Export Credit Guarantee Scheme:* The concept of "export credit guarantee" was defined in Article 1 of the directive as a guarantee provided by the National Bank of Ethiopia to safeguard export financing banks against losses resulting from the export transactions they finance. This credit is issued for a specific period of time that does not exceed 180 days. The objective of the export guarantee scheme is to support the export sector by providing the necessary vehicles to help exporters with bona fide export orders access bank credit. It covers all noncoffee export products. The National Bank of Ethiopia issues pre- or postshipment export credit guarantees to cover 80 percent of the risk that may result from repayment default, and the financing bank covers the remaining portion of the risk. The credit guarantee issued by the National Bank of Ethiopia upon written request of the financing bank serves as part of the collateral when applying to a financing bank for pre- or postshipment finance. The interest rate export credit is the prevailing lending rate in each financing bank (see National Bank of Ethiopia 2002).

- *External Loan and Suppliers' or Foreign Partners' Credit:* Investment Proclamation No. 37/1996 enabled domestic investors in Ethiopia to acquire external loans; to encourage exporters engaged in production to meet expenses, the National Bank of Ethiopia (2002a) issued a Directive for the Registration of External Loan and Suppliers' or Foreign Partners' Credit in 2002. Per Article 1 of the directive, external loans include short-, medium-, and long-term loans obtained from external creditors; suppliers' or foreign partners' credit (usually but not always short-term) is an interim financing provided by a supplier or foreign partner. Recipients of external loans and suppliers' or foreign partners' credit should be registered with the National Bank of Ethiopia. No remittances may leave Ethiopia in convertible currency for the purpose of paying external loans and suppliers' or foreign partners' credit unless recipients have been registered with the bank. The registration for an external loan obtained by an investor is made only after it is clear that the acquired loan will finance an export-oriented investment that generates foreign ex-

change. Registration for suppliers' or foreign partners' credit is made only when it is clear that the credit will finance the importation of capital goods, raw materials, semifinished goods, spare parts, and other inputs to be used in the production and transportation of exportable products.

In sum, the attempts made to enhance exports, particularly nontraditional exports, have not produced the anticipated results. Ethiopia's success in diversifying its exports into high-value products has been limited, many scholars argue, because different governments have tried to increase the volume of production of the same traditional agricultural commodities, as if the country had a comparative advantage in those commodities.

Data and Methodology

Data Types and Sources

The main sources of data for this study were the National Bank of Ethiopia's bulletins, information from the Ministry of Finance and Economic Development, and the Ethiopian Economic Association's statistical database.

Because adequate and reliable quarterly data were not available, annual data were used to examine the link between real export growth (defined as the changes in the log of real exports) and the real economic growth rate (defined as the changes in the log of real GDP). The ideal macroeconomic data available to undertake time-series studies in Ethiopia are from 1960 onward. Even the available data lack accuracy.

Total population is taken as a proxy for labor force, although the use of population in an empirical study may overestimate the contribution of labor to the rate of economic growth.

It is inherently difficult to measure the stock of physical capital because constructing a capital stock series calls for two basic data sets of information—the initial base year for the capital stock and the rate of depreciation—and these are not available. Hence, gross domestic investment or gross fixed capital formation could be used as a proxy for capital. Researchers engaged in testing the export-led growth hypothesis have followed this strategy.

Framework of the Analysis

The new growth theory has resulted in some revision of the determinants of growth in modeling the function of exports in the growth process. This new development has added to the literature on the export-growth nexus. According to this endogenous growth theory, research that has failed to consider the endogenous nature of growth processes is subject to simultaneity bias and yields erratic conclusions.

As indicated in recent empirical literature, excluding relevant variables from the analysis may understate or overstate the causality between variables (Al-Yousif 1999; Keong, Yusop, and Liew 2003; Medina-Smith 2001).

Accordingly, the following production function is adopted:

$$Q_t = f(L_t, K_t, X_t), \tag{6.1}$$

where Q denotes real GDP; K and L denote physical and human capital, respectively; and X represents real exports.

This study used multivariate cointegration and error correction procedure, hypothesizing GDP as a function of aggregate exports, imports, capital, labor force, and exchange rate:

$$GDP_t = f\left(\overset{+}{X}_t, \overset{-}{M}_t, G\overset{+}{C}F_t, \overset{+}{L}_t, E\overset{+}{R}_t\right), \tag{6.2}$$

where GDP_t = real GDP, M_t = real imports, X_t = real exports, GCF_t = real gross capital formation (as a proxy for capital), LAB_t = labor force (as measured by total population), and ER_t = real ex-

change rate (as measured by Br/US$). Signs above the variables suggest the anticipated relationship between explanatory variables, with the dependent variable proposed a priori on the basis of economic theory.

A positive link is expected between economic growth and export expansion. Export growth has a pivotal role in improving productivity growth. According to Balassa (1985), the production of export goods is concentrated on more efficient sectors of the economy. Therefore, export expansion makes it possible to concentrate investment in these sectors, which in turn raise the total productivity of the economy. Lancaster (1980) and Krugman (1984) validated unidirectional causality from output to exports and argued that output growth positively affects productivity growth, whereas cost reduction in labor and capital is expected to promote exports. It is thus reasonable to expect export growth to have a causal relationship with output growth.

The importance of human capital accumulation received due attention in the new growth theory. In particular, it is expected to foster labor productivity and hence growth.

Imports may relate negatively or positively to economic growth, depending on the nature of imported goods. As Riezman, Whiteman, and Summers (1996) have shown, imports play a vital role in the export-led growth relationship in many of the countries considered in their analysis. Because the export externality effects may be the result of the role of exports in easing foreign borrowing constraints, the impact of imports is expected to be significant in the analysis. Contrarily, a rise in imports may reduce the country's international reserves, thereby slowing down the economic growth.

Price instability and political intervention also may impact the relationship between output and export growth. The neoclassical growth theory hypothesized that export performance in developing countries depends on the price of goods and consumer income. That is why the model incorporates the exchange rate. Exchange rate mirrors the price competitiveness in the international market and affects economic performance through export channels (Al-Yousif 1999), and it could serve as a mechanism for adjusting the effects of changes in world prices. Accordingly, the study hypothesizes a positive correlation between the exchange rate and economic growth. Economic theory suggests that depreciation of the domestic currency raises the competitiveness of the domestic commodities, and hence, boosts exports.

Real output and investment appear to be positively correlated. Because saving is insufficient to support domestic investment requirements, the import of capital is a must. Imports can be financed through exports and borrowing from the rest of the world. Thus, investment is relatable to import. Patterson (2004) found a positive link between investment and GDP growth rates in Ethiopia. The results also suggested that financing investment from exports and capital inflow is a viable way to promote growth—that is, exports influence economic growth through their effects on investment.

Introducing logarithm to the variables in equation (6.2) yields

$$LRGDP_t = \alpha_0 + \beta_1 LL_t + \beta_2 LRGCF_t + \beta_3 LRER_t + \beta_4 RLM_t + \beta_5 RLX_t = U_t, \qquad (6.3)$$

where $LRGDP_t$, LL_t, $LRGCF_t$, $LRER_t$, LRM_t, and LRX_t are the logs of output, labor, gross capital formation, exchange rate, and export variables, respectively. The coefficients $\alpha_1, \dots, \beta_5$ are parameters, and U_t is the random disturbance term. Equation (6.3) forms the basis of estimations in this study.

Recent empirical studies used the concept of causality to test the relationship between exports and growth. According to the Granger (1969, 1988) causality approach, a variable, *Y,* is caused by *X* if *Y* can be predicted better from past values of *Y* and *X* than from past values of *Y* alone.

TESTS FOR ORDER OF INTEGRATION. The primary step in time-series regression is testing whether variables share a common trend or each series contains a stochastic trend in such a way that they can be considered to have a long-run equilibrium relationship. This is a test of whether

a series is integrated of order *d,* termed *I* (*d*). The aim is to verify whether the series had a stationary trend and, if nonstationary, to establish orders of integration. Estimating regression in the presence of nonstationary variables based on OLS regression leads to spurious regression, owing to a violation of the classical assumptions about the property of the disturbance term (Enders 1995; Rao 1995). It is also difficult to conduct hypothesis testing in nonstationary variables because the classical assumptions on the property of the disturbance term (that is, zero mean, constant variance, and is autocorrelated) are violated (Rao 1995). The residuals from such a regression will have variance increasing overtime, violating the properties of least squares estimators. One could achieve stationarity by applying appropriate differencing (called *order of integration*), which is referred to as the number of times a series must be differenced before it becomes stationary. Macroeconomic data often are integrated in their level form and stationary after differencing.

The second step in time-series regression is to find whether the variables share a common stochastic trend—that is, to test whether two or more variables are cointegrated.

A causality test holds for only stationary variables and all time-series in the cointegrating equation have the same order of integration. The study first will ascertain the series properties of the variables to avoid spurious regression by performing unit root tests on all the variables involved.

The augmented Dickey-Fuller test (ADF; Dickey and Fuller 1981) is used to check stationarity of the variables (denoted as *I*[0]). In cases where the series are nonstationary about their mean, the traditional suggestion is to differentiate the series, which leads to stationarity that permits the researcher to apply conventional econometrics. However, first differencing is not an appropriate solution to this problem because it prevents detection of the long-run relationship that may be present in the data—that is, the long-run information may be lost. The approach followed to improve this problem is testing for cointegration and error correction models for causality.

The standard Dickey-Fuller test is conducted by estimating the following regression equation:

$$\Delta Y_t = \alpha + \beta_t + \delta Y_{t-1} + U_t, \tag{6.4}$$

where Δ is the differencing operator, Y_t represents the variables to be estimated ($LRGDP_t$, LL_t, $LRGCF_t$, $LRER_t$, LRM_t, LRX_t), α is constant, β is the trend coefficient, U is the white noise residual of zero mean and constant variance, and t is the time or trend variable. The null and alternative hypotheses are

$$H_0 : \delta = 0 \tag{6.5}$$

$$Ha : \delta < 0 \tag{6.6}$$

Accepting the null hypothesis implies that there is a unit root, whereas rejecting it implies that the time-series (Y_t) is stationary. The null hypothesis is then evaluated using the conventional *t*-ratio for δ. This is not without a weakness because it assumes an independently and identically distributed random variable error term with zero mean and constant variance. If the assumption of constant variance and zero mean fails, the limiting distribution and critical values obtained by the simple Dickey-Fuller unit root cannot hold. According to Rao (1995), this problem could be avoided by running the ADF test, which constructs a parametric correction for higher-order correlation by assuming the *Y* series follows an *AR*(*m*) process and adding *m* lagged difference terms of the dependent variable *Y* to the right-hand side of the test regression.

The ADF test is thus derived from the regression equation:

$$\Delta Y_t = \alpha + \beta t + \delta Y_{t-1} + \sum_{i=1}^{m} \gamma_i \Delta Y_{t-i} + U_t, \tag{6.7}$$

where ΔY_{t-1} is equal to ($Y_{t-1} - Y_{t-2}$), ΔY_{t-2} is equal to ($Y_{t-2} - Y_{t-3}$), and so forth, and *m* is the maximum lag length on the dependent variable to ensure that U_t is the stationary random error.

The null hypothesis is rejected if δ is negative and statistically significant. The null hypothesis of a unit root is rejected if the *t*-statistic associated with the estimated coefficient δ exceeds the critical values of the test.

The ADF specification accounts for possible autocorrelation in the error process U_t through the lagged dependent variable on the right-hand side. The practical rule for establishing the value of *m* (that is, the number of lags) is that it should be large enough to ensure that the residual is empirically white noise. An augmentation of one or two lags appears to be sufficient to remove autocorrelation in the error terms. The weakness in this test is that the power of the test may be adversely affected by misstating the lag length (Rao 1995).

TESTS FOR COINTEGRATION. Engle and Granger (1987) introduced the concept of cointegration in which economic variables may reach a long-run equilibrium that depicts a stable relationship. They argued that, despite being individually nonstationary, a linear combination of two or more time-series variables can be stationary: "If such a stationary linear combination (also called cointegrating equation) exists, the nonstationary time-series are said to be cointegrated." Cointegration can be regarded as the empirical counterpart of the theoretical notion of a long-run or equilibrium relationship among the variables (Rao 1995). For a two-variables case, *X* and *Y* are said to be cointegrated of order one, $I(1)$, if both are integrated of order one and there exists a linear combination of the two variables that is stationary, $I(0)$.

Cointegration is particularly useful in modeling series characterized by trends. Trends in data often lead to spurious correlations. This suggests that relationships between variables in a regression equation, when all that is present, are simply correlated time trends. Standard statistical tests are not validated in such cases. Cointegration technique provides a means of identifying and hence avoiding spurious regressions generated by such nonstationary series. When variables are cointegrated, the OLS estimates from the cointegrating regression will be superconsistent, implying that the estimates approach their true parameters at a faster rate than if the variables were stationary and not cointegrated (Gujarati 2003).

The cointegration test is used to verify whether groups of nonstationary series are cointegrated, and the presence of a cointegrating relationship forms the basis of the error correction specification.

To determine the long-run relationship between export growth and economic growth in this study, the Johansen (1988, 1991) multivariate cointegration test is used. It involves the following steps. First, we determine the order of integration for each of the variables under consideration and then estimate cointegrating regression with a vector autoregression model. Finally, if the time-series are cointegrated, we construct the error correction model (ECM).

The Johansen cointegration test is a systems approach based on estimation of a vector autoregressive model. It accounts for the possibility of more than one cointegrating vector when there are more than two variables in a given equation. More than one cointegrating vector implies that the model should consist of two or more equations.

For an intuitive insight into the Johansen method, consider a two-variable case. Suppose that two $I(1)$ variables, *x* and *y*, are determined by the following autoregressive distributed lag equations with a maximum of two periods:

$$Y_t = b_{11}Y_{t-1} + b_{12}X_{t-1} + b_{13}Y_{t-2} + b_{14}X_{t-2} + \varepsilon_{1t}, \tag{6.8}$$

$$X_t = b_{21}Y_{t-1} + b_{22}X_{t-1} + b_{23}Y_{t-2} + b_{24}X_{t-2} + \varepsilon_{2t}. \tag{6.9}$$

Equations (6.8) and (6.9) can be rewritten as follows:

$$\Delta Y_t = (b_{11} - 1)\,\Delta Y_{t-1} + b_{12}\Delta X_{t-1} - (1 - b_{11} - b_{13})Y_{t-2} + (b_{12} + b_{14})X_{t-2} + \varepsilon 1t, \tag{6.10}$$

$$\Delta X_t = (b_{22} - 1)\,\Delta X_{t-1} + b_{21}\Delta Y_{t-1} - (1 - b_{22} - b_{24})X_{t-2} + (b_{21} + b_{23})Y_{t-2} + \varepsilon 2t. \tag{6.11}$$

Equations (6.10) and (6.11) can be expressed in matrix form as follows:

$$\Delta Z_t = B_1 \Delta Z_{t-1} + B_2 \Delta Z_{t-2} + \varepsilon_t, \tag{6.12}$$

where

$$\Delta Z_t = \left[\frac{\Delta y_t}{\Delta x_t} \right], \tag{6.12a}$$

$$\beta_1 = \left[\begin{matrix} \beta_{11} - 1 & \beta_{12} \\ \beta_{21} & \beta_{22} - 1 \end{matrix} \right], \tag{6.12b}$$

$$\beta_2 = \left[\begin{matrix} -(1 - \beta_{11} - \beta_{13}) & \beta_{12} + \beta_{14} \\ \beta_{21} + \beta_{23} & -(1 - \beta_{22} - \beta_{24}) \end{matrix} \right], \tag{6.12c}$$

$$\varepsilon_t = \left[\frac{\varepsilon_{13}}{\varepsilon_{14}} \right]. \tag{6.12d}$$

In a multivariate case of m variables that are all $I(1)$, there will be m equations similar to (6.8) and (6.9). These equations will have a matrix formulation similar to (6.12), except that β_1 and β_2 are now both $m \times m$ matrices and ε_t now contains m disturbances.

In the general case, the rank of β_2 is m, at most. If the rank of β_2 is zero (that is, all its elements are zero), then the m variables are not cointegrated. If the rank of β_2 takes the maximum value, then all the variables are $I(0)$, so the question of cointegration does not arise. If the m variables in equation (6.12) are cointegrated, it means that the m equations are free from spurious regression problems. However, standard estimation methods are not applicable, and a maximum likelihood method should be used. The Johansen procedure not only determines the number of cointegrating vectors but also provides estimates of these vectors.

The first step in this approach is to test the hypothesis that $r = 0$—that is, there are no cointegrating vectors, where r equals the number of the cointegrating vectors. If the value of the likelihood ratio is greater than the critical values given by the test, the hypothesis $r = 0$ is rejected in favor of $r \leq 1$. Nonrejection of this hypothesis implies that the variables are not cointegrated and the procedure stops. Otherwise, if $r = 0$ can be rejected, it is possible to test the hypothesis that there is, at most, one cointegrating vector ($r \leq 1$). If this hypothesis is also rejected, then the hypotheses $r \leq 2, r \leq 3, \ldots$ may be tested in sequence until a hypothesis cannot be rejected.

For the purpose of testing the number of cointegrating vectors, Johansen and Juselius (1990) proposed the use of two likelihood ratio test statistics, namely, the *trace test* and the *maximum eigenvalues test.*

The trace statistic for the null hypothesis of r cointegrating relations is computed as follows:

$$\tau_{trace}(r) = -T \sum_{i=1}^{m} \log[1 - \lambda_t], \tag{6.13}$$

where T denotes total number of usable observations, m represents the number of endogenous variables, λ_i is the largest eigenvalue obtained from the coefficient matrix, and $\tau_{trace}(r)$ is a chi-square distribution with $m - \lambda$ degrees of freedom. Large values of $\tau_{trace}(r)$ give evidence against the hypothesis of λ or fewer cointegration vectors. When all $\lambda_i = 0$, $\tau_{trace} = 0$. The farther the estimated eigenvalues are from zero, the more negative is $\log(1-\lambda_i)$ and the larger the τ_{trace} statistic (Enders 1995).

The maximum eigenvalue statistic test is computed as follows:

$$\tau_{max}(r, r+1) = -T \log(1 - \lambda_{r+1}). \tag{6.14}$$

In this case, the null hypothesis of r cointegrating vectors is tested against the alternative of $r+1$ cointegrating vectors, for $r = 0, 1, 2, \ldots, k-1$. According to Johansen and Juselius (1990), the max-

imum eigenvalue test statistic is more powerful than the trace test. The number of significant nonzero eigenvalues determines the number of cointegrating vectors in the system.

VECTOR ERROR CORRECTION MODEL. If variables are cointegrated, an error correction model exists. The model combines both the short-run dynamics and long-run properties while it avoids the "spurious regression" problem. If variables are cointegrated, then a vector error correction model (VECM) must be used to examine causality.

The VECM often is expressed as follows:

$$DZ_t = \alpha + \Gamma_1 \, DZ_{t-1} + \ldots + \Gamma_k \, DZ_{t-k+1} + \Pi Z_{t-k} + U_t, \tag{6.15}$$

where Π denotes the coefficient matrix. The existence of cointegration between the variables suggests the presence of causality between them in at least one direction. The causal relationship between economic growth and export will be examined, based on ECM in a case where the series are cointegrated.

Equation (6.15) thus can be expressed in the VECM as follows:

$$DLRGDP_t = \alpha_0 + \sum_{i+1}^{a} \alpha_1 \, DLRGDP_{t-i} + \sum_{i-1}^{b} \alpha_2 \, DLRX_t + \sum_{i=1}^{c} \alpha_3 \, DLL_{t-i} + \tag{6.16}$$

$$\sum_{i=1}^{d} \alpha_4 \, DLRGCF_{t-i} + \sum_{i=1}^{e} \alpha_5 \, DLRM_{t-i} + \sum_{i=1}^{g} \alpha_6 \, DLRER_{t-i} + \gamma Z_{yt-1} + \varepsilon_t,$$

$$DLRX_t = \beta_0 + \sum_{i=1}^{m} \beta_1 \, DLRX_{t-i} + \sum_{i=1}^{n} \alpha_2 \, DLRGDP_t + \sum_{i=1}^{o} \alpha_3 \, DLL_{t-i} + \tag{6.17}$$

$$\sum_{i=1}^{p} \alpha_4 \, DLRGCF_{t-i} + \sum_{i=1}^{q} \alpha_5 \, DLRM_{t-i} + \sum_{i=1}^{r} \alpha_6 \, DLRER_{t-i} + \gamma Z_{xt-1} + \varepsilon_t,$$

where Z_{Yt-1} and Z_{xt-1} represent the error terms lagged by one period for the real output and real export equations, respectively. The error correction term is derived from the coefficient estimates obtained from the normalized cointegrating vectors. The speed of adjustment coefficient is of particular interest because it has imperative implications for the dynamics of the system. The coefficient γ measures the long-run equilibrium relationship, while $\alpha_1, \ldots, \alpha_6$ and $\beta_0, \ldots, \beta_6$ measure the short-run causal relationship.

Empirical Results

Tests for Stationarity

As mentioned earlier, the series considered should be stationary and/or cointegrated in order to infer a meaningful relationship from the regression. The ADF test was used to arrange the data in levels of significance and in first differences to test the stationarity of the variables. The results for all the variables are depicted in table 6.2. All variables under investigation are found to be nonstationary at levels, suggesting that the estimated values of all variables in levels are not statistically different from zero (table 6.2a)—that is, they contain a unit root process and do not have the tendency to return to a long-run level. Hence, the series have a stochastic trend (they share a common stochastic movement), which indicates that the null hypothesis cannot be rejected for any of the variables under investigation.

However, after first differencing the null hypothesis, the variables are stationary at the 1 percent, 5 percent, and 10 percent levels of significance and, hence, are characterized by one order of integration $I(1)$ processes. A higher order of differencing is not required because the test strongly rejects the unit root at their first difference. The result suggests that GDP depends on the change in the level of the variables at their first difference.

Table 6.2. *Augmented Dickey-Fuller Tests for Unit Root*

a. Test on levels

Variable/lag	With constant				With trend and constant			
	0	*1*	*2*	*4*	*0*	*1*	*2*	*4*
Log (RGDP)	0.537	0.633	0.998	1.323	–1.324	–1.216	–1.482	–1.320
Log (RX)	–1.126	–1.853	–1.492	–1.131	–1.483	–1.982	–1.622	–1.368
Log (RM)	0.721	0.502	0.463	0.344	–1.959	–2.286	–2.188	–2.061
Log (RGCF)	–0.514	–0.647	–0.582	–0.266	–1.812	–2.103	–1.887	–1.738
Log (RER)	–0.164	0.328	0.216	1.019	–2.154	–1.502	–1.881	–0.817
Log (L)	0.167	0.509	0.669	0.626	–1.631	–1.254	–1.125	–1.193
Critical value 1%	–3.592	–3.597	–3.601	–3.610	–4.186	–4.192	–4.199	–4.212
Critical value 5%	–2.931	–2.933	–2.935	–2.939	–3.518	–3.521	–3.524	–3.530
Critical value 10%	–2.604	–2.605	–2.606	–2.608	–3.190	–3.191	–3.193	–3.196

b. Test on first difference

Variable/lag	With constant				With trend and constant			
	0	*1*	*2*	*4*	*0*	*1*	*2*	*4*
D(Log (RGDP))	–5.817**	–5.963**	–2.832***	–2.712***	–5.805**	–6.005**	–2.782	–2.650
D(Log (RX))	–5.815**	–4.937**	–3.782**	–2.759***	–5.717**	–4.869**	–3.733*	–3.486***
D(Log (RM))	–6.696**	–4.462**	–3.358*	–2.833***	–6.685**	–4.494**	–3.407***	–3.020
D(Log (RGCF))	–5.534**	–4.564**	–3.417*	–3.417*	–5.460**	–4.485**	–3.341***	–3.486*
D(Log (RER))	–7.680**	–4.251**	–4.025**	–3.644**	–7.743**	–4.342**	–4.176*	–3.982*
D(Log (L))	–5.571**	–4.375**	–3.538*	–3.003*	–5.562**	–4.371**	–3.527*	–2.975
Critical value 1%	–3.597	–3.601	–3.606	–3.616	–4.192	–4.199	–4.205	–4.219
Critical value 5%	–2.933	–2.935	–2.937	–2.941	–3.521	–3.524	–3.527	–3.533
Critical value 10%	–2.605	–2.606	–2.607	–2.609	–3.191	–3.193	–3.195	–3.198

Source: Author's calculations.
* Rejection of the null hypothesis at the 5 percent level of significance.
** Rejection of the null hypothesis at the 1 percent level of significance.
*** Rejection of the null hypothesis at the 10 percent level of significance.

Cointegration and Vector Error Correction Model

Because all of the variables appear to be integrated in an order of one and their first differences appear to be stationary, they all are candidates to be included in a long-run relationship. The next procedure is to test for cointegration. The idea behind cointegration analysis is that, although macroeconomic variables may tend to trend up and down over time, groups of variables may drift together.

The Johansen procedure was followed to detect the number of cointegrating vectors. The results show that the variables are cointegrated with a maximum of two cointegrating equations. The null hypothesis of no cointegration among the variables (at $r = 0$ and at $r \leq 1$) is rejected at the 1 percent level of significance (table 6.3).

The results thus demonstrate that the considered variables are cointegrated in that there is a long-run equilibrium relationship among them (that is, these series cannot move too far away from each other or they cannot move independently of each other). The fact that the variables are cointegrated implies that there is some adjustment process in the short run, preventing the errors in the long-run relationship from becoming larger and larger.

The residual generated from the estimation of the long-run output growth model is found to be stationary at the 1 percent significance level, suggesting that the variables are cointegrated. The long-run model is a static regression because it does not allow dynamic adjustments. A

Table 6.3. Trace and Eigenvalues Tests

Null hypothesis	Alternative hypothesis	Statistical value	5% critical value	1% critical value	Eigenvalue
Trace tests					
$r = 0$	$r \geq 0$	129.15	94.15	103.18	0.692
$r \leq 1$	$r \geq 1$	80.86	68.52	76.07	0.622
Eigenvalues tests					
$r = 0$	$r = 1$	48.29	39.37	45.10	0.692
$r \leq 1$	$r = 2$	39.88	33.46	38.77	0.622

Source: Author's calculations.

Table 6.4. Estimates of the Long-Run Parameters (Johansen Method)

Log of real GDP	Coefficient	Standard error	t-statistic
Constant	2.196	0.2219	9.900
LRX	0.2686	0.0961	2.794
LRM	−0.9271	0.2045	−4.533
LL	0.7139	0.3339	2.138
LRGCF	0.3439	0.1723	1.997
LRER	0.0889	0.0490	2.379
R^2	0.7691	n.a.	n.a.
DW statistic	0.5153	n.a.	n.a.

Source: Author's calculations.
Note: GDP = gross domestic product; n.a. = not applicable.

general-to-specific modeling technique was used in the estimating process. The estimation results (table 6.4) reveal that all the variables have the expected signs, implying that export growth, exchange rate, labor, and capital positively affect output growth, and import is found negatively related with output.

The model was run again, excluding real exchange rate, and the results continued to support the hypothesis that export, labor, and capital are positively related with output (results not reported). However, labor and capital would have significant effects on economic growth in the long run. The results suggest the need for enhancing foreign and domestic investments, which currently are low, to enhance sustainable development of the economy. Investment in human capital is also required because a well-educated and healthy labor force is one of the key determinants of economic growth and greater integration into the world economy.

Real exchange rate measures the price of a country's goods relative to its trading partners' prices, expressed in local currency. A real depreciation of the exchange rate enhances the domestic goods in comparison with goods of foreign countries and so improves the country's trade balance, owing to a shift in demand to goods produced locally from those produced abroad. Conversely, a real appreciation of the exchange rate weakens the competitiveness of the domestic economy. Real exchange rate is positively and significantly related to growth, which suggests the need to shift the structure of both production and trade toward products with demand elasticity and to high-value-added products.

Including imports in the system permits us to capture the indirect impact of promoting exports in the accumulation of foreign exchange that enables the economy to finance imports of capital goods—which in turn enhances economic growth. However, the finding that the estimated parameter of real import is highly significant but of a negative sign indicates that much dependence on imports has negatively affected the growth of the economy. The negative sign of

real import tells us that the rise in imports slows down economic growth by affecting the country's international reserves. It might result from the country having spent enormous amounts of foreign exchange to purchase military armaments during the military regime. The negative sign also may suggest that the imports of capital goods and intermediate inputs were stumpy. The goods imported are composed mainly of medicaments, petroleum products, devices for vehicles, electronic devices, and other consumption goods.

Next, it is necessary to estimate the coefficients of the short-run dynamics that have important policy implications. Accordingly, a VECM was estimated, incorporating the short-run interactions and the speed of adjustment toward long-run equilibrium. The short-run dynamics of the variables in the system are influenced by the deviation from equilibrium.

In estimating, the short-run model dummy for drought, war, and government change was introduced to capture their effect from the regression analysis. The model was run with and without the dummy. The estimated results, inclusive of the dummy, are reported here (*t*-ratios in parentheses):

$$D(LGDP) = -0.797 * D(LRGDP_{t-1}) + 0.424 * D(LLt) + 0.443 * D(LRXt) + 0.127 * D(LRERt)$$
$$\quad\quad (-1.462) \quad\quad\quad\quad (2.957) \quad\quad (2.15) \quad\quad\quad (0.594)$$

$$-0.073 * D(LRMt) + 0.027 * D(LRGCFt) - 0.017 * Dummy - 0.525 * ECMt.$$
$$\quad (-0.184) \quad\quad\quad (0.325) \quad\quad\quad (-1.943) \quad\quad (-3.356)$$

Output growth is explained by the rate of growth of capital, labor, export, exchange rate, and the error correction mechanism. As coefficients of the short-run dynamics reveal, however, export and labor are statistically significant, showing their contribution to the growth of the economy in the short-run. Although statistically insignificant, other variables have the expected signs. Ethiopia uses labor as the primary input in production and GDP as a measure of output, and 85 percent of the population resides in rural areas. It is sensible that the coefficient of labor is positive.

The result confirms the hypothesis that exports positively and significantly affect the growth of the Ethiopian economy. The literature relates dynamic technological spillover with manufactured exportable products in that income-elastic goods have a larger effect on economic growth than do agricultural goods. However, the results obtained in this study lead to skepticism of the argument that a positive and significant link between exports and output growth is achieved only when the country's export basket is dominated by higher-value-added manufactured exports. The results also showed that the export and economic growth link holds in the face of an inward-oriented trade strategy. This study does not suggest that Ethiopia should continue exporting the same traditional agricultural products that have been exported for decades. Rather, the study strongly supports diversification of the economy away from low-value-added agricultural products to manufactures. Diversifying the productive structure is a key strategy to foster economic growth.

The results of the pairwise Granger causality test at different lag lengths (that is, 2–4) reveal that the causation is not strong, thus suggesting that export growth might affect output growth through another channel (which could be discovered through additional research). In empirical studies of exports and growth, a major problem arises because exports are component parts of the increase in output (Sharma and Panagiotidis 2004), and evidence found in support of the export-led growth hypothesis could be biased by the built-in correlation between exports and GDP. Estimating the model with other specifications not subject to this bias (for example, by simultaneous method) may bring about a better result. There is a need, for instance, to estimate the model (which was not attempted in this study) using the shares of exports in GDP and investments in GDP as potentially endogenous variables in the system to reconfirm the hypothesis. No attempt was made to measure the extent to which the export sector is influenced by in-

ternal supply factors and external factors. The accuracy and consistency of data might have some effect on the validity of the results.

The magnitude of the error correction coefficient is found to be –0.525, implying that, within one year, it adjusts about 52.5 percent of the disequilibria—that is, deviation from long-run equilibrium is adjusted fairly quickly and 52.5 percent of the disequilibrium is removed each year. The negative coefficient of the dummy variable suggests that the prolonged civil war in the military regime and the border conflict, the cyclical droughts and famines that hit the country, and the change of government bringing in new ideology have negatively affected the growth of the economy.

Conclusion and Recommendations

Much has been written in the literature regarding the role of the export sector in improving economic growth. The purpose of this study was to investigate empirically the nexus of exports and output growth in the Ethiopian context, using cointegration and error-correction procedures covering the period 1960/61 to 2003/04. The study used a multivariate time-series approach within a production function framework, considering real figures of GDP, exports, exchange rate, gross capital formation, imports, and population. The inclusion of these other variables would prevent the estimates suffering from omitted-variable bias. Consistent with expectations, export growth and output growth were positively related, which supports the export-led growth hypothesis.

Ethiopia is one of the poorest countries on the African continent, despite its massive productive land and abundant resources with immense potential for development. The fact that Ethiopia, albeit endowed with plenty of natural and water resources, is one of the poorest countries seems paradoxical and suggests the need to bring about a green revolution. To this end, long- and short-term measures need to focus on developing and using water resources for agriculture, energy, and other purposes. For a country with the largest livestock population in Africa, the production of semiprocessed and finished leather products is insufficient and the tanning and leather industry runs at partial capacity because the supply of hides and skins is inadequate. The textile industry also runs at partial capacity, although the country has the capacity for high-quality and large-volume domestic cotton production and there is a relatively cheap labor force. Because of this under-capacity utilization of the textile industry, the country has failed to capitalize on the opportunities offered by the U.S. African Growth Opportunities Act. The failure of the country to expand its economy and bring about structural transformation that would diversify the productive structure in general and the export base in particular is related to its inability to adopt coherent strategies and more proactive policies.

Despite the focus on export diversification in the country's development plans, the export pattern is still dominated by traditional products and relies greatly on coffee while its world price is fluctuating. All of that is symptomatic of the lack of economic transformation and an absence of structural change in the mode of production. There is concentration both in commodity and country of destination for Ethiopian exports. Although the export of cut flowers is increasing quickly, success in diversifying the export base and exploiting the hitherto untapped resources is not to be gainsaid. The country has failed to exploit its comparative advantage of geographic proximity to the African market.

The export performance is impeded by a multitude of internal and external problems, including feeble infrastructure, lack of physical and skilled human capital, poor export facilitation strategy, market vagaries, climatic conditions, and some policies of the advanced economies. All these challenges suggest that the country should spare no effort to diversify its exports on a rapid and sustainable basis.

We are in the era of globalization wherein the strongly competent economies could reap the benefits of global competition and regional integration. Ethiopia has applied for membership in

the WTO, and its accession to the WTO is one of the principal factors for facilitating economic growth. To benefit from its accession, the country needs to strengthen its domestic industries and increase its export competitiveness. Improving its position in the international economy will enable it to benefit from the existing and future opportunities in the global trading system. In this regard, the study suggests the ardent need for a concerted effort to improve internal conditions and bring about structural transformation, notably diversification of the productive structure and curtailment of supply side constraints. Building the capacity of existing manufacturing enterprises, improving their efficiency and productivity, and setting up joint ventures with established business in other countries to benefit from the transfer of their expertise remain crucial actions to be taken in Ethiopia.

It is impossible to imagine a vibrant Ethiopian economy without structural transformation. In other words, over the long run, Ethiopia should diversify its economy toward higher-value-added and income-elastic products, away from primary agricultural products. This is in line with the widely accepted view that a country having a higher share of economic sectors with high value added is less prone to external shocks, market vagaries, weather conditions, and unjust competition policies. The key impediments of the manufacturing industries are structural. Thus, the contribution of the sector to growth and transformation of the economy can be attained only by removing the serious structural barriers that the sector has faced. Rehabilitating the domestic manufacturing industries and encouraging both private domestic and foreign investments are strategic issues for success that call for the attention of the government, policy makers, and other stakeholders.

The study also underlines the need to strengthen export capacity and to promote diversification in the export sector to achieve sustainable growth. Export promotion and diversification call for a closer look at each sector of the economy. Hence, designing export promotion strategies, policies, and support services conducive to stimulating competitiveness remain crucial steps. Maintaining an export-friendly, effective exchange rate, lowering the tax burden on exports and imports of production inputs, granting subsidies to exporters, providing exporters with easy access to foreign exchange for the purchase of intermediate items, and granting exporters preferential and/or lower interest rates on bank loans are some of the mechanisms this study suggests to encourage domestic exports capable of competing in the world market. Ethiopia needs to foster competitiveness so that the export sector's capacity to make profits is increased and domestic consumption is reduced. Furthermore, the concerned ministry bureau needs to intensify its efforts to identify the specific key commodities in which Ethiopia has a comparative advantage and may diversify (for instance, expanding the output of horticultural and flower products, fruits and vegetables, and livestock products; exploiting apicultural possibilities). On one hand, doing so could generate employment and income and could stimulate growth; on the other hand, it could produce duty-free access to important markets. To become competitive in the leather industry, as many scholars argue, there is a need to educate the rural population about how to take better care of skins and hides so that the quality of raw materials supplied to tanners is improved and production capacity can be enhanced, to provide veterinary services in rural areas so that diseases can be treated before they cause extensive damage to hides and skins, to establish more slaughter houses to lessen damages owing to traditional slaughtering methods, and to use the rich experience of partner countries to find solutions to the problems encountered by the local tanners and leather commodities manufacturers.

Intensifying agricultural production and effectively using agricultural research, water harvesting, and small-scale irrigation for increased yield and production are strategies of paramount importance in boosting exports and reaching a sustainable growth trajectory.

Ensuring export diversification also demands identifying key supply constraints that handicap the sector's performance and taking appropriate measures to improve domestic conditions for business development. Particular emphasis should be given to improving problems in infrastructure, such as roads, air transport, railways and ports, water and energy supply, rural electrification

and telecommunication services, and other facilities. Enhancing infrastructure would contribute greatly to facilitating export diversification and effectively competing in the international market. Poor infrastructure is one of the stumbling blocks for attracting foreign investment.

Successfully diversifying exports is a means of extricating the country from its excessive dependence on an inflow of foreign loans and aid and of eradicating its abysmal poverty. The government needs to work with the business community to establish an atmosphere of mutual trust and confidence and to persuade its members to engage in export diversification policy making.

Due attention also should be given to exploiting abundant mineral resources, the export of which would be a good source of foreign exchange. Preliminary explorations have suggested that gold, platinum, phosphate, petroleum, and metallic and chemical minerals are available in great quantities. To benefit from the global trading system and maintain rapid economic growth, Ethiopia needs to expand the extracting and exporting of mineral resources. The study suggests the need to develop new policies and strategies to encourage investments in these untapped resources.

As repeatedly argued in this study and elsewhere, success in bringing about economic transformation, increasing production, diversifying exports, and ultimately breaking the crippling grip of underdevelopment relies on addressing the problems of governance; avoiding bureaucratic red tape; creating enabling supervisory, regulatory, and legal environments; and increasing private investment, particularly in the productive sectors.

The results obtained from the regression indicate that labor affects output growth positively and significantly, both in the short run and over the long term. Economic theory asserts that the rise in productivity results from changes in knowledge as people learn through experience to accomplish familiar tasks better. Global trade competitiveness demands unreserved effort in educating the people and improving their health. In this regard, Ethiopia needs to develop in its active labor force the skills required to improve productivity. Although the enrollment rate has been improving, due attention should be given to control the quality of education and ensure that educational institutions are delivering the required skills. The use of indigenous knowledge also may help exploit the potential resources to accelerate economic growth.

References

Ahmad, J., and S. Harnhirun. 1992. "The Causality between Export and Economic Growth in the Asian Countries: Cointegration and Error Correction Model Approach." Photocopy. Concordia University, Montreal.

Ahmad, J., and A.C.C. Kwan. 1991. "Causality between Exports and Economic Growth: Empirical Evidence from Africa." *Economics Letters* 37 (3): 243–48.

Alam, M. Imam. 2003. "Manufactured Exports, Capital Goods Imports and Economic Growth: Experience of Mexico and Brazil." *International Economic Journal* 17 (4): 85–105.

Al-Yousif, Y. K. 1997. "Exports and Economic Growth: Some Empirical Evidence from the Arab Gulf Countries." *Applied Economics* 29 (6): 693–97.

———. 1999. "On the Role of Exports in the Economic Growth of Malaysia: A Multivariate Analysis." *International Economic Journal* 13: 67–75.

Amoateng, K., and B. Amoako-Adu. 1996. "Economic Growth, Export and External Debt Causality: The Case of African Countries." *Applied Economics* 28 (1): 21–27.

Bahmani-Oskooee, M., and J. Alse. 1993. "Export Growth and Economic Growth: An Application of Cointegration and Error Correction Modeling." *Journal of Developing Areas* 27 (4): 537–42.

Balassa, B. A. 1978. "Exports and Economic Growth: Further Evidence." *Journal of Development Economics* 5 (2): 181–89.

———. 1985. "Exports, Policy Choices and Economic Growth in Developing Countries after the 1973 Oil Shocks." *Journal of Development Economics* 18 (1): 23–35.

Begum, S., and A. F. Shamsuddin. 1998. "Exports and Economic Growth in Bangladesh." *Journal of Development Studies* 35 (1): 89–114.

Ben-David, D., and M. B. Loewy. 1998. "Free Trade, Growth and Convergence." *Journal of Economic Growth* 3: 143–70.

Bhagwati, J. N. 1986. "Rethinking Trade Strategy." In *Development Strategies Reconsidered,* ed. J. P. Lewis and V. Kallab, 91–104. New Brunswick, NJ: Transaction Books.

———. 1988. "Export-Promoting Trade Strategy: Issues and Evidence." *World Bank Research Observer* 3 (1): 27–57.

Birdsall, N. 2002. "A Stormy Day on an Open Field: Asymmetry and Convergence in the Global Economy." In *Globalisation, Living Standards and Inequality: Recent Progress and Continuing Challenges,* ed. D. Gruen, T. O'Brien, and J. Lawson, 66–87. Sydney: Reserve Bank of Australia.

Buffie, E. F. 1992. "On the Condition for Export-Led Growth." *Canadian Journal of Economics* 25 (1): 211–25.

Chang, T., W. Fang, W. Liu, and H. Thompson. 2000. "Exports, Imports, and Income in Taiwan: An Examination of the Export-Led Growth Hypothesis." *International Economic Journal* 14 (2): 151–60.

Chenery, H. B., and A. Strout. 1966. "Foreign Assistance and Economic Development." *American Economic Review* 679–732.

Chow, P.C.Y. 1987. "Causality between Export Growth and Industrial Development: Empirical Evidence from the NICs." *Journal of Development Economics* 26: 55–63.

Dickey, D. A., and W. A. Fuller. 1981. "Likelihood Ratio Statistics for Autoregressive Time Series with a Unit Root." *Econometrica* 49 (4): 1057–72.

Doraisami, A. 1996. "Export Growth and Economic Growth: A Reexamination of Some Time Series Evidence of the Malaysian Experience." *Journal of Developing Areas* 30: 223–30.

Edwards, S. 1993. "Openness, Trade Liberalization, and Growth in Developing Countries." *Journal of Economic Literature* 31: 1358–93.

EEA/EEPRI (Ethiopian Economic Association/Ethiopian Economic Policy Research Institute). 2002. "Second Annual Report on the Ethiopian Economy." Addis Ababa.

Enders, W. 1995. *Applied Econometric Time Series.* New York: John Wiley and Sons.

Engle, R. F., and C.W.J. Granger. 1987. "Cointegration and Error Correction: Estimation and Testing." *Econometrica* 55: 251–76.

Esfahani, H. S. 1991. "Exports, Imports and Economic Growth in Semi-industrialized Countries." *Journal of Development Economics* 35: 93–116.

Evenson, R. E., and L. Singh. 1997. "Economic Growth, International Technological Spillovers, and Public Policy: Theory and Empirical Evidence from Asia." Discussion Paper 777, Economic Growth Center, Yale University, New Haven, CT.

Fafchamps, M. 2000. "Engines of Growth and Africa's Economic Performance." Photocopy. Department of Economics, Oxford University, Oxford, UK.

Feder, G. 1983. "On Exports and Economic Growth." *Journal of Development Economics* 12 (1/2): 59–73.

Frankel, J. A., and D. Romer. 1999. "Does Trade Cause Growth?" *American Economic Review* 89 (3): 379–99.

Gebre-Michael, A. 2004. "Globalization: Its Promises and Perils to the Ethiopian Economy." Paper presented at the Second International Conference on the Ethiopian Economy, Ethiopian Economic Association, Addis Ababa, June 3–5.

Giles, J. A., and C. L. Williams. 2000. "Export-Led Growth: A Survey of the Empirical Literature and Some Non-Causality Results, Parts 1 and 2." *Journal of International Trade and Economic Development* 9: 261–337.

Granger, C. W. 1969. "Investigating Causal Relationships by Economic Models and Cross Spectral Models." *Econometrica* 37: 424–38.

———. 1988. "Some Recent Developments in a Concept of Causality." *Journal of Econometrics* 39: 199–211.

Grossman, G. M., and E. Helpman. 1991a. *Innovation and Growth in the Global Economy.* Cambridge, MA: MIT Press.

———. 1991b. "Trade Knowledge Spill-over and Growth." *European Economic Review* 35: 517–36.

Gujarati, D. N. 2003. *Basic Econometrics,* 4th ed. New York: McGraw-Hill.

Gwartney, J., and R. Lawson. 2002. "Trade Openness, Sound Policies and Prosperity." *Fraser Forum* 8–9.

Hachicha, N. 2003. "Exports, Export Composition and Growth: A Simultaneous Error Correction Model for Tunisia." *International Economic Journal* 17 (1): 101–17.

Hart, O. 1983. "The Market Mechanism as an Incentive Scheme." *Bell Journal of Economics* 14: 366–82.

Heller, P. S., and R. C. Porter. 1978. "Exports and Growth: An Empirical Investigation." *Journal of Development Economics* 5: 191–93.

Helpman, E., and P. R. Krugman. 1985. *Market Structure and Foreign Trade: Increasing Returns, Imperfect Competition, and the International Economy.* Cambridge, MA: MIT Press.

Hsiao, M. W. 1987. "Tests of Causality and Exogeneity between Exports and Economic Growth: The Case of Asian NICs." *Journal of Economic Development* 12: 143–59.

Imperial Government of Ethiopia. 1955. "The First Five-Year Development Plan (1957/58–1961/62)." Addis Ababa.

———. 1962. "The Second Five-Year Development Plan (1962/63–1966/67)." Addis Ababa.

———. 1968. "The Third Five-Year Development Plan (1968/69–1973/74)." Addis Ababa.

Jaffee, D. 1985. "Export Dependence and Economic Growth: A Reformulation and Respecification." *Social Forces* 64: 102–18.

Johansen, S. 1988. "Statistical Analysis of Cointegration Vectors." *Journal of Economic Dynamics and Control* 12: 231–54.

———. 1991. "Estimation and Hypothesis Testing of Cointegrating Vectors in Gaussian Vector Autoregressive Models." *Econometrica* 59: 1551–80.

Johansen, S., and K. Juselius. 1990. "Maximum Likelihood Estimation and Inference on Cointegration with Application to the Demand for Money." *Oxford Bulletin of Economics and Statistics* 52 (2): 169–210.

Jung, W. S., and P. J. Marshall. 1985. "Exports, Growth and Causality in Developing Countries." *Journal of Development Economics* 18 (1): 1–12.

Kavoussi, R. M. 1984. "Export Expansion and Economic Growth: Further Empirical Evidence." *Journal of Development Economics* 14 (1): 241–50.

Keesing, D. B. 1967. "Outward-Looking Policies and Economic Development." *Economic Journal* 77 (306): 303–20.

Keong, C. C., Z. Yusop, and V. K. Liew. 2003. "Export-Led Growth Hypothesis in Malaysia: An Application of Two-Stage Least Square Technique." International Finance Working Paper 03080002. http://129.3.20.41/eps/if/papers/0308/0308002.pdf.

Kravis, I. B. 1970. "Trade as a Handmaiden of Growth: Similarities between the 19th and 20th Centuries." *Economic Journal* 80 (320): 850–72.

Krueger, A. O. 1978. *Foreign Trade Regimes and Economic Development: Liberalization Attempts and Consequences.* Cambridge, MA: Ballinger Publishing.

———. 1995. *Trade Policies and Developing Nations.* Washington, DC: Brookings Institution Press.

Krugman, P. R. 1984. "Import Protection as Export Promotion." In *Monopolistic Competition in International Trade,* ed. H. Kierzkowski. Oxford, UK: Oxford University Press.

Krugman, P. R., and M. Obstfeld. 2003. *International Economics: Theory and Policy,* 6th ed. Reading, PA: Addison-Wesley.

Lancaster, K. 1980. "Intra-industry Trade under Perfect Monopolistic Competition." *Journal of International Economics* 10: 151–75.

Levine, R., and D. Renelt. 1992. "A Sensitivity Analysis of Cross-Country Growth Regression." *American Economic Review* 82: 942–63.

Lucas, R. E. 1988. "On the Mechanics of Economic Development." *Journal of Monetary Economics* 22: 3–42.

Lussier, M. 1993. "Impacts of Exports on Economic Performance: A Comparative Study." *Journal of African Economies* 2 (1): 106–26.

McKinnon, R. 1964. "Foreign Exchange Constraint in Economic Development and Efficient Aid Allocation." *Economic Journal* 74 (294): 388–409.

Medina-Smith, E. J. 2001. "Is the Export-Led Growth Hypothesis Valid for Developing Countries? A Case Study of Costa Rica." United Nations Conference on Trade and Development, Policy Issues in International Trade and Commodities, Study Series 7. http://r0.unctad.org/ditc/tab/publications/itcdtab 8_en.pdf.

Michael, H. 2002. "Causality between Exports, Imports and Income in Trinidad and Tobago." *International Economic Journal* 16 (4): 97–106.

Michaely, M. 1977. "Exports and Economic Growth: An Empirical Investigation." *Journal of Development Economics* 4 (1): 49–53.

Ministry of Trade and Industry, Government of Ethiopia. 1998. Export Development Strategy. Addis Ababa.

Morton, K., and P. Tulloch. 1977. *Trade and Developing Countries.* London: Corm Helm.

Moschos, D. 1987. "Export Expansion, Growth, and the Level of Economic Development: An Empirical Analysis." *Journal of Development Economics* 30: 93–102.

Myint, H. 1958. "The Classical Theory of International Trade and the Underdeveloped Countries." *Economic Journal* 68: 317–37.

National Bank of Ethiopia. 1998. "Directive for the Retention and Utilization of Export Earnings and Inward Remittances." Directive No. FXD/115/1998, Addis Ababa.

———. 2002a. "Registration of External Loan and Suppliers' or Foreign Partners' Credit." Directive No. REL/005/2002. Addis Ababa.

———. 2002b. "Revised Directive for the Establishment and Operation of Export Credit Guarantee Scheme." Directive No. SBB/33/2002. Addis Ababa.

Nega, B., K. Moges, and W. Gebeyehu. 2002. "Sources and Uses of Export Support Services in Ethiopia." Working Paper 2/2002, Ethiopian Economic Association, Ethiopian Economic Policy Research Institute, Addis Ababa.

Nidugala, G. 2001. "Exports and Economic Growth in India: An Empirical Investigation." *Indian Economic Journal* 47 (3): 67–78.

Oxley, L. 1993. "Cointegration, Causality and Export-Led Growth in Portugal, 1865–1985." *Economics Letters* 43: 163–66.

Patterson, S. 2004. "Economic Growth and Investment Nexus in Ethiopia." Paper presented at the Second International Conference on the Ethiopian Economy, Ethiopian Economic Association, Addis Ababa, June 3–5.

Prebisch, R. 1950. *The Economic Development of Latin America and Its Principal Problems.* New York: United Nations.

Promfret, R. 1997, *Development Economics.* New York: Prentice Hall.

Ram, R. 1985. "Exports and Economic Growth: Some Additional Evidence." *Economic Development and Cultural Change* 33: 415–25.

———. 1987. "Exports and Economic Growth in Developing Countries: Evidence from Time-Series and Cross-Section Data." *Economic Development and Cultural Change* 36 (1): 50–72.

Rao, B. B. 1995. *Cointegration: For the Applied Economist.* New York: Palgrave Macmillan.

Rashid, A. I. 1995. "Trade, Growth and Liberalization: The Indian Experience, 1977–1989." *Journal of Developing Areas* 29: 355–70.

Riezman, R. G., C. H. Whiteman, and P. M. Summers. 1996. "The Engine of Growth or Its Handmaiden? A Time-Series Assessment of Export-Led Growth." *Empirical Economics* 21: 77–110.

Rivera-Batiz, L., and P. Romer. 1991. "Economic Integration and Endogenous Growth." *Quarterly Journal of Economics* 106 (2): 531–55.

Shan, J., and F. Sun. 1998. "On the Export-Led Growth Hypothesis: The Econometric Evidence from China." *Applied Economics* 30 (8): 1055–65.

Sharma, A., and T. Panagiotidis. 2004. "An Analysis of Exports and Growth in India: Cointegration and Causality Evidence." http://www.lboro.ac.uk/departments/ec/Reasearchpapers/2004/SharmaIndia_RDE.pdf.

Singer, H. W. 1950. "The Distribution of Gains between Investing and Borrowing Countries." *American Economic Review Papers and Proceedings* 40: 473–85.

Thornton, J. 1996. "Cointegration, Causality and Export-Led Growth in Mexico (1985–1992)." *Economic Letters* 50 (3): 413–16.

Thungswan, S., and H. Thompson. 2002. "Exports and Income in Thailand." *Journal of International Economics.*

Tyler, W. G. 1981. "Growth and Export Expansion in Developing Countries: Some Empirical Evidence." *Journal of Development Economics* 9 (1): 121–30.

Wade, R. H. 2002. "Globalisation, Poverty and Income Distribution: Does the Liberal Argument Hold?" In *Globalisation, Living Standards and Inequality: Recent Progress and Continuing Challenges,* ed. D. Gruen, T. O'Brien, and J. Lawson, 37–65. Sydney: Reserve Bank of Australia.

Acronyms and Abbreviations

ACP	African, Caribbean, and Pacific
ADF	augmented Dickey-Fuller test
ASA	Association for Social Advancement
DLB	District Trade Development Joint Loan Board
ECM	error correction model
EER	effective exchange rate
EPI	export price index
EPZ	export processing zone
ERS	Economic Recovery Strategy for Wealth and Employment Creation
EU	European Union
FIES	Family Income and Expenditure Survey
GCI	Growth Competitiveness Index
GCR	*Global Competitiveness Report*
GDP	gross domestic product
ICT	information and communications technology
INDEC	Instituto Nacional de Estadística y Censos [Argentinean Bureau of Statistics]
JJ/WBGSP	Joint Japan/World Bank Graduate Scholarship Program
KM	Kaplan-Meier
kWh	kilowatt hour
Napocor	National Power Corporation
NGO	nongovernmental organization
OECD	Organisation for Economic Co-operation and Development
OLS	ordinary least squares
Plan Jefes	Plan Jefes y Jefas de Hogar Desocupados
REER	real effective exchange rate
SMEs	small and medium enterprises
SOE	state-owned enterprise
SPSS	statistical analysis software
UA	unemployment assistance
UGLB	Uasin Gishu District Trade Development Joint Loan Board
UI	unemployment insurance
ULC	unit labor cost
VECM	vector error correction model
WBI	World Bank Institute
WTO	World Trade Organization

All amounts are presented in U.S. dollars, unless otherwise indicated.

The Scaling-Up Program, JJ/WBGSP

Phone: 202-473-6849   Fax: 202-522-4036
http://www.worldbank.org/wbi/scholarships/scalingup
Email: spscalingup@worldbank.org

The World Bank
1818 H Street, NW
Washington, DC 20433 USA

THE WORLD BANK