

SPECIAL TALENT GROUP (STG)
AZERBAIJAN STATE ECONOMICS UNIVERSITY
Baku, Azerbaijan

DUKE CENTER FOR INTERNATIONAL DEVELOPMENT
Sanford School of Public Policy, Duke University
Durham, NC (USA)

STRENGTHENING APPLIED PUBLIC FINANCE CAPACITY IN AZERBAIJAN

**Teaching Applied Public Finance for Economic Development and
Applied Project Appraisal & Risk Management for Economic Development at
Azerbaijan State Economics University**

Baku, Azerbaijan
17 February – 23 April 2010

Table of Contents

Introduction.....	1
1. Course Development.....	2
1.1 Applied Project Appraisal and Risk Management for Economic Development:	2
1.2 Applied Public Finance for Economic Development	3
2. ASEU Academic Course Delivery.....	5
2.1 Special Talent Group	5
2.2 Duke University Teaching Faculty	5
2.3 Course Materials	7
2.4 ASEU Enrolled Students	7
3. Strengthening Faculty Capacity:.....	7
4. Way Forward	9
Annex 1: Syllabus for Applied Project Appraisal Course	13
Annex 2: Syllabus for Applied Public Finance Course	18
Annex 3: Course Materials for Applied Project Appraisal.....	24
Annex 4: Course Materials for Applied Public Finance.....	67
Annex 5: Students in Applied Project Appraisal and Applied Public Finance Courses.....	147
Annex 6: Duke University Executive Education Programs in Applied Public Finance.....	148

Introduction

The Azerbaijan State Economics University (ASEU) and other institutions of higher learning in Azerbaijan play a critical role in enhancing the quality and quantity of professionals with the analytical capacity and strong skills in applied public finance economics. These universities are responsible for providing skilled policy and technical analysts to the public and private sectors in order to facilitate the transition to a prosperous and efficient market economy.

This USAID intervention, funded under the Trade and Investment Reform Support Project (TIRSP) being implemented by Chemonics, is designed to strengthen the capacity and ability of ASEU to effectively deliver the highest quality of education needed to empower the future cadre of applied public finance specialists in Azerbaijan. These young ASEU graduates are expected to engage and participate in the future formulation and implementation of the key public finance, revenue mobilization, budgeting and capital expenditure analysis reforms needed to promote sustainable economic and social development, equity and the reduction of poverty in Azerbaijan.

The Duke Center for International Development (DCID), Sanford School of Public Policy at Duke University provided this capacity development and institutional strengthening support for the Azerbaijan Economics State University (ASEU). As one of several multidisciplinary research and training centers within the Sanford School of Public Policy, DCID is dedicated to strengthening capacity for international development through interdisciplinary approaches to practice, research, international advising, mid-career training and post-graduate education.

Duke University provided an experienced teaching team, with each member having extensive teaching experience in both academic and applied capacity development programs for students and government officials as well as practical professional working experience in the area of applied public finance and project appraisal with governments in various developing and transitional countries. This practical overseas work experience in applied public finance and project appraisal, combined with the ability to effectively communicate this expertise and experience in the class room enabled the Duke Team to share both the theory and practice involved with the ASEU students and faculty in Azerbaijan.

This USAID-funded capacity strengthening intervention was designed to assist in three areas, namely:

- (1) course development, including curriculum and case materials in the area of applied public finance and project appraisal;
- (2) effective delivery of such academic programs to ASEU top level undergraduate and graduate students enrolled in the Special Talent Group (STG); and
- (3) strengthening of ASEU faculty capacity in the knowledge of applied public finance and project appraisal and course delivery.

1. Course Development

The course design, materials and assignments for the two academic courses were those adapted from the academic and professional courses which have been effectively taught in the Duke University Sanford School of Public Policy in the area of project appraisal and risk management and public finance in developing and emerging economies.¹ These courses were tailored appropriately to the Azerbaijan economic and institutional environment, focusing on the key relevant economic issues and challenges today. Applied public finance skills in the area of capital expenditures analysis and public financial revenue policy are critical to the future of Azerbaijan as the country further embraces a participatory, market-based, democratic environment focused on increased efficiency, equity and accountability.

The following two courses were delivered to the ASEU Special Talent Group.

1.1 Applied Project Appraisal and Risk Management for Economic Development:

This course on **Applied Project Appraisal and Risk Management for Economic Development** focuses on financial, economic, stakeholder, and risk analysis of capital investment projects and development programs as well as risk management through a combination of lectures, real and applied case studies, group discussions, and computer exercises.

This course takes participants through a flexible appraisal framework suited to handle different types of projects (from commercial enterprises and utilities to infrastructure investments and social programs), and a wide range of issues from environmental to risk management. This framework is particularly well suited to the assessment of projects implemented by the private sector in competitive markets in different sectors, in regulated sectors, or in partnership with the public sector. Public sector programs and investments are also well suited for analysis. In these cases, the analysis of project designs from the perspectives of the different stakeholders is crucial to the choice of sustainable and performance-enhancing arrangements.

This course involves the completion of a number of short assignments (problem sets) which require students to understand and apply the theory and practice of project appraisal and risk management. To provide an integrated approach for the students, the students are required to develop a financial, economic and distributional analysis of an actual US\$208 million dollar Hydroelectric Power investment. This applied project exercise enables students to develop and apply the MS Excel computer and analytical skills to complete a full analysis to determine the investment feasibility of the project from the financial, economic and distributional points of view.

¹ The course material is drawn from both the academic and professional executive education courses including the Duke University Project Appraisal and Risk Management (PARM) and the Program on Tax Analysis Revenue Forecasting (TARF): see <http://sanford.duke.edu/centers/dcid/executive/open/parm.php> and <http://sanford.duke.edu/centers/dcid/executive/open/tarf.php>, respectively.

This course covers the following topics:

- Introduction and overview
- Constructing financial cash flows
- Alternative points of view
- Discounting & alternative investment criteria
- Timing and scale of project appraisal
- Valuation of assets
- Inflation and exchange rates
- Integrated analysis of projects
- Risk analysis and management
- Contracting and public private partnerships
- Principles of welfare economics
- Economic prices of non-traded goods
- Economic prices of traded goods
- Economic cost of foreign exchange, capital and labor
- Distributional impacts of projects
- Infrastructure and Social projects
- Environmental impacts and their valuation
- Public Private Partnership projects

This course provides an excellent opportunity for the students to integrate their learning in economics, accounting, finance and management in an applied case of project appraisal and risk management. The **financial analysis component** allows students to combine their accounting and financial knowledge with a macroeconomic context incorporating such impacts as inflation and foreign exchange rates. The **economic analysis component** then allows students to integrate their understanding of microeconomics, local markets and international trade as well as to apply new concepts of welfare economics to develop the conversion factors needed to transform the financial prices of outputs and inputs into their true economic costs and benefits to the economy. The **distributional analysis component** of project appraisal then allows students to develop the stakeholder analysis skills to allocate the project externalities to various segments of the society. The **risk analysis component** exposes the students to the practical dimensions of using applied statistics to identify and manage project risk. Project appraisal skills empower the students showing the practical dimensions of their academic studies at ASEU and can inspire them to apply these knowledge and skills to make an impact on the future Azerbaijan economy.

1.2 Applied Public Finance for Economic Development

This course on **Applied Public Finance for Economic Development** covers the core concepts underlying the need for and modalities and analysis of financing public sector services and enterprises. It examines the economic roles and rationale for government and potential methods of financing government. The course begins with an analysis of the Musgrave Framework for public finance, identifying the key functions of stabilization, distribution and allocation.

Under the allocation rationale, students are exposed to the “market failures” (imperfect information, monopolies, externalities and public goods). The course provides a detailed review of public goods and externalities generated by private markets and the consequences for government fiscal and regulatory policy. The role of decentralization and local governments are discussed in the context of improving the efficiency and accountability of public service delivery.

The nature of fiscal policy and its relationship to macroeconomic policy is covered, including the role of government in generating savings, investment and growth. The Harrod-Domar model is introduced to show the linkage of improved savings/investment to economic growth rates. Issues of tax policy and administrative reforms are identified, including the importance of tax capacity and tax effort as well as the importance of the buoyancy and elasticity of the tax system.

This course then focuses on the development of theoretical and applied techniques for identifying and evaluating the impacts (e.g., revenues, incidence and efficiency) of alternative tax and other financing mechanisms for public sector projects, programs and policies. It reviews and analyzes a range of tax policy structures for raising public finances, including customs and excise duties, sales and value added taxes, income taxes, natural resource revenues, property taxes and other local taxes.

This course involves the completion of a number of problem sets which provide the students with the opportunity to apply the theory and concepts to practical exercises in public finance. The five problem sets cover the issues related to the role of government, government interventions in cases of market failure, externalities and public goods, fiscal decentralization, taxation and economic growth, tax analytics, and tax capacity/effort, tax buoyancy/efficiency as well as specific exercises related to the main revenue sources such as income, VAT and excises. The problem sets include both conceptual and analytical components giving the student experience in answering both qualitative and quantitative questions.

This course provides an excellent opportunity for the students to understand the proper role of government, approaches for government intervention (e.g., regulation, taxation and subsidies), and the specific dynamics of taxation with economic growth, tax design and administration, and specific tax policy issues related to the major revenue sources of government. International experience is emphasized in each lecture to provide the students with a global context for the ongoing public financial activities within Azerbaijan. Students are able to see the interaction of macro and micro economics overlapping in the practical area of applied public finance and welfare economics.

See Annex 1 for course syllabus for Applied Project Appraisal and Risk Management for Economic Development and Annex 2 for the course syllabus for Applied Public Finance for Economic Development.

2. ASEU Academic Course Delivery

The two ASEU academic courses on (1) Applied Public Finance for Economic Development and (2) Applied Project Appraisal and Risk Management for Economic Development were successfully delivered to the top level ASEU students in the “Special Talent Group”.

2.1 Special Talent Group

This Special Talent Group (STG) is a highly selective group from among the ASEU students. The STG students are selected through a set of highly competitive examinations based on academic merit, potential for excellence and English language ability. STG students are selected at the conclusion of their freshman year, with STG courses, therefore, available from the sophomore year upwards. There are about 200 STG students out of a total of 19,000 students at ASEU, approximately 1.0 % of the student body. All classes are conducted in English and the academic performance standards for the courses are set high.

It is anticipated that these top level STG students will go on for overseas graduate degrees in economics prior to returning to Azerbaijan to gradually become the future economic policy leaders in government and business. Ultimately there are high expectations that these STG students will be working in key positions to influence the design and implementation of the policy and administrative reforms needed to move Azerbaijan towards a more efficient and accountable market-based economy. The ASEU STG curriculum is designed to lay the academic and motivational foundation to enable the achievement of this vision.

2.2 Duke University Teaching Faculty

The course delivery was provided by Dr. Roy Kelly, Rubino Sugana, Dr. D.N.S. Dhakal and Brij Kishore from Duke University (USA) (<http://sanford.duke.edu/DCID>). All four members of the program faculty are experienced teachers and professional practitioners, with extensive academic training, teaching experience and practical field work experience in the various areas of applied public finance, including taxation/revenue policy and administration and financial and economic project appraisal and risk management. All faculty members have worked extensively in international development environments on a variety of countries as both long term resident advisors and as short term consultants.

The following is a short biographical sketch of the individual Duke Team faculty:

Dr. Roy Kelly teaches public finance, tax analysis, local government finance and project evaluation. He is a Professor of the Practice of Public Policy, Sanford School of Public Policy, Duke University. Previously, he spent 19 years with Harvard University at the Kennedy School of Government, the Harvard Institute for International Development (HIID), and the Harvard International Tax Program. Dr. Kelly served as a resident policy advisor to the Ministry of Finance (Indonesia) from 1982-1988, Ministry of Local Government (Kenya) from 1998-2005,

Ministry of Economy and Finance (Cambodia) from 2005-2007 and the Prime Minister's Office Regional Administration and Local Government (Tanzania) from 2007-2009. In addition, he has provided short-term consultancies and training in Albania, Poland, Kyrgyzstan, Uzbekistan, Estonia, Russia, Mongolia, Argentina, Bolivia, Dominican Republic, Mexico, Colombia, Ecuador, Chile, Indonesia, Vietnam, Nepal, Uganda, Kenya, Malawi, Tanzania, and South Africa. Dr. Kelly received his MCRP and PhD in Urban Planning from Harvard University.

Rubi Sugana teaches public finance and tax analysis in the Duke University Program on Tax Analysis and Revenue Forecasting (TARF) and Analytical Method for Taxation in the Duke University International Taxation Program. Previously, he taught in the Harvard University Program on Tax Analysis and Revenue Forecasting from 1995-2000 and in the Harvard University Program on Information Technology for Fiscal Systems from 1993-1995. Mr. Sugana has over 15 years of international experience in designing tax administration systems, developing tax analysis and revenue forecasting models, and supporting capacity development in such countries as Bhutan, Ghana, India, Indonesia, Jordan, Kenya, Lithuania, Nepal, Russia, and Tanzania. He holds a BSc in engineering from the Institute of Technology (Bandung, Indonesia), an MA (International Development Policy) from Duke University, an MPA from the Kennedy School of Government Harvard University and a Certificate from the International Tax Program, Harvard Law School.

Dr. D.N.S. Dhakal teaches project evaluation and appraisal in the Duke University Program on Project Appraisal and Risk Management (PARM). Prior to teaching at Duke, he served as Faculty for the Harvard University Program on Investment Appraisal and Management University in 1990 and 1994-2000. Dr. Dhakal has also taught project appraisal extensively in India, South Africa, Malaysia, Thailand, Ukraine, Sri Lanka, Islamic Development Bank (Saudi Arabia) and African Development Bank (Tunisia) and Caribbean Development Bank (Barbados). Dr. Dhakal has been a United Nations University Fellow on the Highland-Lowland Interactive System Project at the University of Colorado (Boulder) and the University of Berne, Switzerland and served for a year as Economic Advisor to the Ministry of Trade, Industry and Power of the Government of Bhutan. He holds a Bachelors degree in Mining Engineering from the Indian School of Mines, an MPA from the Kennedy School of Government Harvard University and a Ph.D. in Mineral Economics from the Colorado School of Mines.

Brij Kishore teaches project evaluation and appraisal in the Duke University Program on Project Appraisal and Risk Management (PARM) and in Duke University senior executive programs for officials from China, Kazakhstan and India. From 2003 to 2009, he was a visiting professor on environmental economics at the School of Planning and Architecture, New Delhi, India. He also chaired the Ministry of Environment and Forest's Committee on Environmental Clearance for Housing and Special Economic Zone Projects. Mr. Kishore has over 35 years of national and international experience in policy, program and project development, administration, implementation and management in the Government of India and served as Secretary of Planning and Investment in charge of capital budgeting in the State Government of Uttar Pradesh. He holds a BA in Physics and Mathematics and a M.Sc. in Physical Sciences from the University of Allahabad.

2.3 Course Materials

The course materials include a combination of overheads, readings, assignments and course notes which were developed on specific concepts. The course material was maintained through a Yahoo Group, one for each course. Students subscribed to the course yahoo group to have access to the course materials and to interact with the faculty and the fellow students.

See Annex 3 for the course materials for the Applied Project Appraisal and Risk Management Course and Annex 4 for the course materials for the Applied Public Finance Course.

2.4 ASEU Enrolled Students

Both courses were over-subscribed, with 80 students interested in taking the Applied Project Appraisal and Risk Management for Economic Development course and with 65 students interested in taking the Applied Public Finance for Economic Development course. Prior to the commencement of the academic semester, the ASEU administration reduced the size of the class to allow about 35-40 students to enroll in each course.

In actuality, the Applied Project Appraisal and Risk Management course was attended by 32 students while the Applied Public Finance course was attended by 40 students. The participating students included 2nd, 3rd and 4th year undergraduates and graduate students. Generally speaking, the Public Finance Course had the set of older students while the project appraisal course included younger students. The reason was that many of the older students had already had the opportunity to take a previous course in project appraisal at ASEU.

See Annex 5 for a List of Students attending the Courses

3. Strengthening Faculty Capacity:

The Duke Team also worked with selected ASEU faculty members to strengthen their ability to effectively deliver these courses in the future. This was carried out through holding special faculty discussion sessions to review the course materials and assignments, course and student expectations, suggestions on teaching styles and approaches and typical questions which arise in teaching this material.

A faculty seminar was held to work with select ASEU faculty to better understand the course design, objectives, teaching materials, assignments, and student progress. The objective was to strengthen the faculty to expose them to the course contents, walk through the teaching material, go through the course substance, explain the problem set assignments and models, and discuss possible strategies for effectively teaching the course content to ASEU students.

At the STG Dean and faculty request, the faculty seminar focused initially on the project appraisal and risk management course. The project appraisal course was given the priority for several reasons:

- (1) This project appraisal course has been held previously several times at ASEU, thus some faculty had been previously exposed to the course content and had an interest in understanding the material more deeply and in having a chance to ask questions on the substance;
- (2) This project appraisal course was identified as a priority for adoption into the standard ASEU curriculum as it is seen as a course which allows for the practical integration of knowledge from other courses such as accounting, finance, macroeconomics, microeconomics and management; and
- (3) This project appraisal course has been quite popular with the students as it is seen to give a set of valuable skills which can be immediately applied in the real world.

The initial faculty seminars on project appraisal were structured into three 1-day sessions as follows:

Session One focused on the financial appraisal topics, including the objective of project appraisal, the components, time value for money and discounting, constructing a cash flow statement, alternative points of view, inflation and foreign exchange movements, and timing and scaling of investment decisions. The integrated hydroelectric case study used in the ASEU regular course was given to the faculty members, allowing them to better understand the construction of an integrated financial analysis and to understand the Excel modeling complexity which the ASEU students are expected to master during the first 4 weeks of the course.

Session Two focused on the economic appraisal topics, including an introduction to welfare economics (Harberger Three Postulates), understanding the difference between financial and economic benefits and costs, the economic opportunity cost of non-tradeable goods, tradeable goods, and an introduction to developing the national parameters of the economic cost of capital, economic cost of foreign exchange and the economic opportunity cost of labor. In addition, the seminar discussed the distributional analysis where the economic externalities are identified and allocated across the various stakeholders.

Session Three focused on aspects of risk analysis and risk management. The importance of using sensitivity, scenario or Monte Carlo simulation analysis was identified; with the various implications for identifying the costs or risks, the analysis of risk and the management of risks. Issues related to the importance of using contract to allocate and manage risks were discussed.

An important focus of the faculty seminar was to closely follow the project appraisal and risk management course currently being offered to the ASEU students so that the faculty can directly see what the ASEU students are learning and/or expected to learn during the course.

Using the same hydroelectricity power case as the students gives the faculty a flavor of the high benchmark set for the ASEU students.

The selected faculty members were also invited to attend the various lectures as their work and teaching schedules permitted. Due to scheduling problems with other teaching and work responsibilities, only one faculty member was able to attend the majority of the Public Finance course lectures. The ASEU Special Talented Group (STG) lecturers are all part time faculty who also are working full time teaching at other universities and training institutions and/or working at various economic research centers or private sector businesses. Thus, it was difficult to arrange a time to enable the faculty to participate in the courses and to identify a time for the faculty seminars to allow for unfettered participation.

In addition to strengthening individual faculty capacity and to delivering high quality applied public finance courses, this USAID intervention provided an opportunity to further explore the options for and to begin to strengthen stronger, more long-term, organic linkages between ASEU (and other local universities) with premier academic institutions from the United States such as Duke University. The future effectiveness of ASEU can be further strengthened and sustained through more effectively developing support linkages with quality higher level academic institutions such as Duke University.

These support linkages could include visiting faculty teaching academic courses in Azerbaijan, joint provision of mid-career executive workshops to Azerbaijan government officials or business professionals, joint research and faculty exchange/faculty development activities. In addition, there is the possibility of promoting ASEU and other Azerbaijan higher education institutions to become a hub for regional-based capacity building in applied public finance and project appraisal to neighboring countries such as Georgia, Uzbekistan, Kyrgyzstan, and Turkmenistan.

4. Way Forward

The USAID-funded capacity development support to the Azerbaijan State Economics University (ASEU) provided an excellent opportunity to strengthen the in-country capacity to deliver high quality academic and practical training in applied public finance and project appraisal and risk management. These applied public finance skills are essential in order to empower the core cadre of economic analysts and decision makers needed to promote continued efficient and equitable economic growth and development.

This capacity building initiative has initiated the process of laying a strong foundation for building the essential in-country institutional capacity needed to provide the steady stream of applied public finance professionals needed for the public and private sectors in Azerbaijan. It will now be critical to further strengthen this institutional foundation to enable ASEU to provide both a strong academic curriculum in applied public finance at the University as well as to broaden the capacity building to include mid-career government officials in the concerned ministries and agencies.

Linking the academic training in applied public finance to practical mid-career professional training to government officials will be mutually complementary and beneficial as follows:

- ASEU faculty resources will be able to be mobilized to teach both undergraduate and graduate students as well as to provide practical hands-on training to government officials dealing with project appraisal and risk management. This will enable the faculty to bring in practical cases for the ASEU students while, at the same time, to disseminate the theory and concepts to those working in the real world.
- Top ASEU students will be able to assist ASEU faculty deliver the mid-career workshops which will further strengthen their own understanding and allow them to work with government practitioners in the application of project appraisal skills. These top students will be exposed to practitioners, learning and making contacts for future employment networks.
- Government practitioners will be able to learn both the theory and practical applications of applied public financial analysis and program appraisal/risk management concepts. The training will assist the practitioners improve the project design, allocation decisionmaking, implementation and monitoring to improve the economic development outcomes in Azerbaijan.

The way forward would build on this capacity building foundation, strengthen the in-country faculty, improve the design and delivery of practical public finance courses/workshops, expand the training on project appraisal and risk management to include mid-career government practitioners within the key ministries and agencies in Azerbaijan and explore the possibility of expanding this capacity building to include mid-career practitioners from neighboring countries in the region.

Specifically the following could be envisioned:

- 4.1 **Develop and provide a 3-year capacity building support program** which would enable Azerbaijan institutes of higher learning, such as the Azerbaijan State Economics University (ASEU) and the Azerbaijan State Agricultural University (ASAU), to strategically develop, strengthen, implement and sustain a high quality of curriculum and course delivery to their top academic students who are the future policy reformers and leaders within Azerbaijan. Linking these Azerbaijan institutions to key counterparts institutions in the United States will provide the sustainable level of quality support needed for this purpose.

The program would also support the ability of these institutes to expand their influence outside of academic undergraduate and graduate education to include executive education programs which can strengthen and influence mid-career government officials in applied public finance and economics such as project appraisal and risk management. As identified above, strong linkages between the universities and government

ministries/agencies will generate strong synergies of mutual benefit leading to enhanced economic and social development.

The program would also promote the possibility of establishing these institutions as a focus for regional based training and capacity development in applied public finance and project appraisal. That is, it is envisioned that these Azerbaijan institutes of higher learning could become a center of excellence in the field of applied public finance to train government officials from the neighboring countries such as Georgia, Turkmenistan, Krygyzstan and Uzbekistan.

- 4.2 **Provide further faculty development** to the Azerbaijan institutes of higher learning through enabling participation of key faculty members to attend intensive executive education training programs in the United States. For example, selected faculty could attend such programs as the Project Appraisal and Risk Management (PARM), Tax Analysis and Revenue Forecasting, (TARF), Fiscal Decentralization and Local Government Financial Management (PFD) and Budgeting and Financial Management in the Public Sector (BUDGET) offered at Duke University each year.

See Annex 6 for Duke University Executive Education Training Programs or at www.sanford.duke.edu/dcid.

It is recommended that these faculty members be sent along with key government officials from the key ministries to maximize the effectiveness of the training process. Sending groups of 2-4 individuals from different Azerbaijan institutions would provide an ideal opportunity for individual learning and sharing with other international professionals but would also allow the Azerbaijan group to become a core team which can disseminate this knowledge to others upon their return to Azerbaijan.

Faculty and officials would create a natural team to learn together, build real Azerbaijan sector-specific case studies, and integrate this knowledge into key ministries upon return. Key is to create core group of analysts with capacity, interest and motivation to apply and sustain introduction of project appraisal within government system.

Faculty development can also be supported by team teaching the in-country academic courses jointly with international professors and through in-country faculty seminars, among other initiatives.

- 4.3 **Integrate project appraisal skills to the key sector ministries and agencies** within Azerbaijan (eg, agriculture, water, roads and power). To achieve immediate improvements in the public financial decisions in Azerbaijan, it is essential to build effective linkages between the universities and government. It will be critical to empower the universities to provide mid-career educational programs for those government officials engaged in the day to day public sector decisions related to government capital budget expenditures and revenue mobilization. These mid career practitioners need the

practical skills needed to make better decisions, identify the financial, economic and distributional impacts of capital investment decisions, along with risk analysis and risk management considerations.

This capacity building in project appraisal and risk management within the government structure would best be accomplished through intensive 3-4 week workshops. These workshops would include a combination of lectures on the theory and practice, group discussion sessions, and practical computer-based case studies.

Case studies within the workshop would focus on practical aspects of investment decisions in such areas as infrastructure projects (eg, water, roads), social projects (eg, health, education), agriculture projects (eg, irrigation, food processing), mining projects (eg, coal, oil); power projects (eg, electricity), among others. In addition, the participants would be expected to complete an actual case based on information from their offices. In this way, all participants would learn and see immediately the application of their learning to their work.

- 4.4. **Promote Azerbaijan as a regional capacity development center** for practical, applied public finance and project appraisal. In addition to strengthening the in-country capacity to provide high quality academic training and practical executive training, these Azerbaijan institutions could become the regional “Center of Excellence” for practical applied public finance and project appraisal training. Professionals from neighboring countries, such as Georgia, Uzbekistan, Turkmenistan, and Krygyzstan, could benefit from the strengthening institutional capacity within Azerbaijan in the area of applied public finance and project appraisal.

It is expected that these Azerbaijan institutions and faculty resources could be supported by establishing close linkages with the top level international academic and training institutions such as Duke University to ensure the highest quality of education and practical and relevant case study applications.

Annex 1: Syllabus for Applied Project Appraisal Course

APPLIED PROJECT APPRAISAL AND RISK MANAGEMENT FOR ECONOMIC DEVELOPMENT

COURSE SYLLABUS Spring 2010

Instructors:	Professors Deo Dhakal, Roy Kelly & Brij Kishore
Location:	Room 320 ASEU Building
Class timings:	Wednesday 11:30 – 1:00 pm Saturday: 11:30 – 1:30 pm
Class Tutorial/Office Hours :	Wednesday 3-6 pm Saturday 2-5 pm
Group website:	ASEUprojectappraisal-subscribe@yahoogroups.com (mandatory to subscribe)

Description

The course teaches financial, economic, stakeholder, and risk analysis of capital projects and development programs as well as risk management through real and applied case studies, lectures, group discussions, participant presentations, and computer exercises.

The course takes participants through a flexible appraisal framework suited to handle different types of projects (from commercial enterprises and utilities to infrastructure investments and social programs), and a wide range of issues from environmental to risk management. This framework is particularly well suited to the assessment of projects implemented by the private sector in competitive markets in different sectors, in regulated sectors, or in partnership with the public sector. Public sector programs and investments are also well suited for analysis. In these cases, the analysis of project designs from the perspectives of the different stakeholders is crucial to the choice of sustainable and performance-enhancing arrangements.

The course will cover the following topics:

- Introduction and overview
- Constructing financial cash flows
- Alternative points of view
- Discounting & alternative investment criteria
- Timing and scale of project appraisal
- Valuation of assets
- Inflation and exchange rates
- Integrated analysis of projects
- Risk analysis and management
- Risk management and corporate finance
- Principles of welfare economics
- Project finance
- Economic prices of non-traded goods
- Economic prices of traded goods
- Economic cost of foreign exchange, capital and labor
- Distributional impacts of projects
- Infrastructure and Social projects
- Environmental impacts and their valuation
- Public Private Partnership projects

- Contracting and public private partnerships

Books and manuals for the course

Glenday, Shukla & Tham, Project Appraisal Manual, 2007

Jenkins & Harberger, Manual, 2007

Belli et al. Economic analysis of investment operations, 2001

(For articles see reading requirements for each week.)

Class requirements

You are required to subscribe to the listserv (web-group), and check the group messages and files regularly for timely access to class materials and announcements.

Attitude is important to facilitate learning for everybody in the class. You are expected to demonstrate respect for time and efforts of others as well as of yours. Responsible behavior and respect for the others willingness to learn is part of your commitment to this class.

Do not ask permission to get out of and re-enter the class. Do it without asking, and very quietly without interrupting the course.

Honest and professional behavior is also part of your commitment to this class. University authorities will be informed in case of cheating, copying, plagiarizing, or unauthorized collaboration. Familiarize yourself with relevant university policies.

If you miss a class, you are responsible for getting class notes, announcements and schedule changes from a fellow student.

In-class exercises can be given at unannounced dates and times. There will be no make-up opportunities.

Remember, this is a course in which all the knowledge builds up. If you get behind, it will be difficult to catch up. Therefore, it is important that you read the materials timely for you to participate in class discussions.

Grading

Problem Sets	40%
Quiz 1	25%
Quiz 2	35%
Total	100%

Course assignments

There will be five problem sets. Each problem set is 8% of the total grade. There are two quizzes. The second quiz will be comprehensive.

The following is a preliminary weekly class schedule. The materials may be adapted based on the pace and classroom environment.

WEEK ONE

Session 1

Topics: Introduction to an analytic framework for integrated project analysis

Required readings:

Glenday, Shukla & Tham, Project Appraisal Manual, 2007, Chapter 2.

Jenkins & Harberger, Manual, 2007, Chapters 1 and 2.

Belli et al. Economic analysis of investment operations, 2001, Chapters 1 to 3.

Session 2

Topics: Time Value of Money (TVM); Investment criteria

Required readings:

Jenkins & Harberger, Manual, 2007, Chapters 4

WEEK TWO

Session 3

Topics: Constructing financial cash flows

Required readings:

Jenkins & Harberger, Manual, 2007, Chapters 3

Belli et al. Economic analysis of investment operations, 2001, Chapters 4

Session 4

Topics: Alternative points of view; Valuation of assets, Debt Coverage Ratios

Required readings:

Jenkins & Harberger, Manual, 2007, Chapters 3

Belli et al. Economic analysis of investment operations, 2001, Chapters 4

Teaching Note: Annual Debt Service Coverage Ratio & the Loan Life Coverage Ratio

WEEK THREE

Session 5

Topics: Inflation and exchange rates

Required readings:

Jenkins & Harberger, Manual, 2007, Chapters 6

Belli et al. Economic analysis of investment operations, 2001, Chapters 5

Session 6

Topics: Timing and Scale in project appraisal

Required readings:

Jenkins & Harberger, Manual, 2007, Chapters 5

WEEK FOUR

Session 7

Topics: Project finance: Debt finance and default; Cost of equity

Required readings:

Glenday, G. Risk sharing contracts in project appraisal, Canadian Journal of Program Evaluation, 1996

Session 8

Topics: Risk analysis and Risk management

Required readings:

Glenday, G. Risk sharing contracts in project appraisal, Canadian Journal of Program Evaluation, 1996

WEEK FIVE

Session 9

Topics: Review for Quiz 1

Session 10

Topics: Quiz 1

WEEK SIX

Session 11

Topics: Applied welfare economics and Harberger's three postulates

Required readings:

Emery, Chapters 5, 6 and 7 (For Review of Microeconomics)

Harberger, A. 'Three basic postulates for applied welfare economics: an interpretive essay, *Journal of Economic Literature*, Vol IX, No. 3, Sept. 1971.

Session 12

Topics: Economic prices of non-traded goods

Required readings:

Teaching note #2, Estimation of economic prices for non-tradable goods and services. 2007

WEEK SEVEN

Session 13

Topics: Economic prices of traded goods

Required readings:

Teaching note #3, Estimation of economic prices for traded goods and services. 2007

Session 14

Topics: Economic opportunity cost of foreign exchange, capital and labor;

Required readings:

Jenkins & Harberger, Manual, 2007, Chapters 10

WEEK EIGHT

Session 15

Topics: Distributional impacts of projects

Required readings:

Harberger, A. 'Basic needs versus distributional weights in social cost-benefit analysis',
Economic Development and Cultural Change, Vol. 32, No. 3, April 1984.

Jenkins & Harberger, Manual, 2007, Chapters 14

Lecture notes (to be distributed)

Session 16

Topics: Applications to Environmental Impact/ Public Private Partnership projects;

Required readings:

Economic Valuation of Ecosystem Services

John Dixon and Stefano Pagiola, "Economic Analysis and Environmental
Assessment," Environment Department, World Bank, 1998.

Economic Commission for Europe: A Guide to Promoting Good Governance in Public
Private Partnerships, 2007

Course Summary Review will be held Saturday 2-5 pm Session

WEEK NINE

Session 17

Topic: Quiz 2

Annex 2: Syllabus for Applied Public Finance Course

APPLIED PUBLIC FINANCE FOR ECONOMIC DEVELOPMENT Spring 2010

Faculty:	Professors Roy Kelly and Rubino Sugana
Location:	Room 320, ASEU Building
Class timings:	Wednesday 8:30 – 10:00 am Saturday, 8:30 – 10:30 am
Class Tutorial/Office Hours:	Wednesday 3-6 pm Saturday 2-5 pm
Group website:	ASEUpublicfinance-subscribe@yahoogroups.com (mandatory to subscribe)

Description

The public finance course covers the core concepts underlying the need for and modalities and analysis of financing public sector services and enterprises. It examines the economic roles and rationale for government and potential methods of financing government.

This includes a detailed review of public goods and externalities generated by private markets and the consequences for government fiscal and regulatory policy. The nature of fiscal policy and its relationship to macroeconomic policy is covered, including the role of government in generating savings, investment and growth. In addition, the course covers the advantages and disadvantages of decentralization and the role of local governments in financing economic development and delivering public services.

The course focuses on the development of theoretical and applied techniques for identifying and evaluating the impacts (eg, revenues, incidence and efficiency) of alternative tax and other financing mechanisms for public sector projects, programs and policies. It reviews and analyzes a range of tax policy structures for raising public finances, including customs and excise duties, sales and value added taxes, income taxes, natural resource revenues, property taxes and other local taxes.

Class requirements

You are required to subscribe to the listserv (ASEUpublicfinance@yahoogroups.com), and check the group messages and files regularly for timely access to class materials and announcements.

Attitude is important to facilitate learning for everybody in the class. You are expected to demonstrate respect to time and efforts of others as well as of yours. Responsible behavior and respect for the others willingness to learn is part of your commitment to this class. Do not ask permission to get out of and re-enter the class. Do it without asking, and very quietly without interrupting the course.

Honest and professional behavior is also part of your commitment to this class. University authorities will be informed in case of cheating, copying, plagiarizing, or unauthorized collaboration. Familiarize yourself with relevant university policies.

If you miss a class, you are responsible for getting class notes, announcements and schedule changes from a fellow student. In-class exercises can be given at unannounced dates and times.

There will be no make-up opportunities. Remember, this is a course in which all the knowledge builds up. If you get behind, it will be difficult to catch up. Therefore, it is important that you read the materials timely for you to participate in class discussions

Grading

Problem Sets	40%
Quiz 1	25%
Quiz 2	35%
Total	100%

Course assignments

There will be 5 problem sets. There are two quizzes. The second quiz will be comprehensive. The following is a preliminary weekly class schedule. The materials will be adapted based on the pace and classroom environment.

Required Text

G.P. Shukla and G. Glenday, *Public Finance in Open Economies*, (Duke Center for Internal Development, Duke University, 2002, mimeo) Referred to as "**Manual**"

Other Useful Reference Texts

1. Harvey Rosen and Ted Gayer, *Public Finance* (Eighth Edition) (McGraw Hill/Irwin, 2008)
2. Jonathan Gruber, *Public Finance and Public Policy* (Second Edition) New York: Worth, 2007)
3. Ronald Fisher, *State and Local Public Finance*, 3rd edition, Thomson South-Western, 2007.
4. Parthasarathi Shome (ed.), Tax Policy Handbook, (International Monetary Fund, 1995).
5. Richard A. and Peggy B. Musgrave, *Public Finance in Theory and Practice*. Fifth Edition, (New York: McGraw Hill, 1989).
6. Stephen Lewis, Jr., *Taxation for Development: Principles and Applications* (Oxford University Press, 1984).

Required Readings designated by **

WEEK ONE

Session 1

Topics: Public Finance Introduction and Overview

Readings:

- a. Manual, Chap 1**
- b. Gruber, Chap 1**
- c. Musgrave, Chap 1

Session 2

Topics: Role of Government: Welfare Economics and Externalities

Readings:

- a. Manual, Chap 4**
- b. Harberger, Arnold, "Three basic postulates for applied welfare economics" *Journal of Economic Literature*, Vol IX, No. 3. September 1971, pp 785-797. Reprinted in *Taxation and Welfare* by Harberger, Little Brown, 1974.**
- c. Graham Glenday, "Need For Government Revenue: Roles Of Government" prepared for African Development Institute, African Development Bank Workshop on Economic Management, *Taxation and Tax Administration in Africa (1998)* (mimeo)**
- d. Musgrave, Chs. 4 (pp. 41-58), 5 (pp. 59-72)

Problem Set #1: Due on 27th February

WEEK TWO

Session 3

Topics: Responding to Market Failures: Externalities, Imperfect Information, Monopolies and Public Goods

Readings:

- a. Fisher, Chapter 2: "Microeconomic Analysis: Market Efficiency and Market Failure"***
- b. Rosen and Gayer, Chapter 4: "Public Goods"*** pp 52-67 and Chapter 5: "Externalities" pp. 71-84 only**

Session 4:

Topics: Decentralization and Role of Local Governments in Public Finance

Readings:

- a. Oates, Wallace. "An Economic Approach to Federalism" in S. Baker and C. Elliot (ed.) Readings in Public Sector Economics (Lexington, MA: Heath, 1990), pp. 554-565**
- b. Roy Kelly, "Intergovernmental Revenue Allocation Theory and Practice: Application to Nepal", *Asian Journal of Public Administration*, Vol. 21, No. 1, 1999**
- c. Charles McLure, "The Tax Assignment Problem: Conceptual and Administration in Achieving Subnational Fiscal Autonomy", Washington, DC: World Bank, 2001
- d. Tanzi, Vito. "Pitfalls on the Road to Fiscal Decentralization", Economic Reform Project, Global Policy Program, Working Paper No. 19. Washington, DC: Carnegie Endowment for International Peace, 2001. (<http://www.carnegieendowment.org/files/19Tanzi.pdf>)

Problem Set #2: Due on 6th March

WEEK THREE

Session 5

Topics: Fiscal Policy

Readings:

- a. Manual, Chap 1 and 2.5**
- b. Perkins, D. H., S. Radelet, D. R. Snodgrass, M Gillis, and M Roemer, Economics of Development, Fifth Edition, (New York: W.W.Norton, 2001), Chap 12**
- c. Gruber, Chap 4 "Tools of Budget Analysis" read pages 112-117 only**

Session 6

Topics: Principles of taxation, Economic Efficiency and Incidence

Readings:

- a. Ronald Fisher, State and Local Public Finance, 3rd edition, Thomson South-Western, 2007. Chapter 12, "Principles of Tax Analysis"**
- b. Graham Glenday, "Principles of Taxation" prepared for African Development Institute, African Development Bank Workshop on Economic Management, Taxation and Tax Administration in Africa (1998) (mimeo)**
- c. Graham Glenday, "Effects of Taxation: Economic Efficiency and Incidence" prepared for African Development Institute, African Development Bank Workshop on Economic Management, Taxation and Tax Administration in Africa (1998) (mimeo)**
- d. Graham Glenday, GP Shukla and R. Sugana, Revenue Forecasting Manual (2007), Chap 9 "Excise Tax Revenue Estimation"

Problem Set #3: Due on 13th March

WEEK FOUR

Session 7

Topics: Revenue growth and stability; Technical efficiency of taxes: tax capacity and tax effort

Readings:

Readings:

- a. Manual, Chapter 2**
- b. Musgrave, Ch. 34 (pp. 582-601)**
- c. P.B. Jayasundera, (Central Bank of Sri Lanka), "Buoyancy and Elasticity of Taxes," Report of the Taxation Commission 1990, Sessional Paper No. 1, 1991, Colombo, Sri Lanka, Ch. 8.**

Session 8

Topics: User Charges and Property Taxation

Readings:

- a. Ronald Fisher, "Chapter 8: Pricing of Government Goods: User Charges" in State and Local Government Finance, third edition, (pp. 179-195)**
- b. John Boland and Dale Whittington, "The Political Economy of Increasing Block Tariffs in Developing Countries" Special Paper, pp1-15

- c. Roy Kelly, "Designing a Property Tax Reform Strategy for Sub-Saharan Africa: An Analytical Framework Applied to Kenya" Public Budgeting and Finance, 20(4), 2000, pp 36-51**
- d. Michael E. Bell, "An Optimal Property Tax: Concepts and Practices", World Bank 1999

WEEK FIVE

Session 9

Topics: Review

Session 10:

Topics: Quiz 1

WEEK SIX

Session 11

Topics: Consumption and production taxes: Excises, sales taxes and VAT

Readings:

- a. Manual, Chapter 10.1-3**
- b. Tax Policy Handbook, (pp. 75-85)**
- c. R. Bird, "A New Look at Indirect Taxation in Developing Countries," World Development, Vol. XV, No. 9, (1987), pp. 1151-1161**

Session 12

Topics: VAT continued

Readings:

- a. Manual, Chapter 10.4-10**
- b. Tax Policy Handbook, (pp. 86-99)**
- c. L. Ebrill, M. Kenn, J. Bodin and V. Summers, *The Modern VAT* (Washington: IMF, 2001), Chap 11, pp. 113-124) and Chapter 13-15, pp. 138-165. **
- d. Richard Bird and P. Gendron, "Key Issues in VAT Design" and "New Issues in VAT Design" in The VAT in Developing and Transitional Countries (New York: Cambridge University Press, 2007, pp. 108-160.

WEEK SEVEN

Session 13

Topics: Taxes on international trade

Readings:

- a. Manual, Chapter 11**
- b. Tax Policy Handbook, (pp. 199-215)**
- c. Lewis, Section 4 on Indirect Taxes**

Session 14

Topics: Personal income tax – tax base and rates & Corporate income tax; integration and harmonization

Readings:

- a. Manual, Chapter 6**
- b. Tax Policy Handbook (pp. 117-133) and (pp.134-158)**
- c. Rosen and Gayer, Ch. 17 (pp. 380-403) and Ch 19 (pp438-459)**

WEEK EIGHT

Session 15

Topics: National resource taxation

Readings:

- a. Manual, Chapter 12**
- b. Tax Policy Handbook, (pp. 237-241)**
- c. G. Jenkins, "How to Tax Mineral Extraction-Alternative Systems of Taxing Mineral Industries," in Bird and Oldman, Taxation in Developing Countries, Fourth Edition (Baltimore: Johns Hopkins University Press, 1990), pp. 279-285.**

Session 16

Topics: Comprehensive Review session

WEEK NINE

Session 17

Topics: Quiz 2

Annex 3: Course Materials for Applied Project Appraisal

PROJECT APPRAISAL: AN OVERVIEW

Prof. Roy Kelly
Sanford School of Public Policy, Duke University
(roykelly@duke.edu)

Azerbaijan State Economics University (ASEU)
Spring 2010

1

COURSE OUTLINE (1)

Week 1:

- Analytical Overview of Project Appraisal
- Time Value and Investment Criteria

Week 2:

- Constructing Project Cash Flows
- Alternative points of view; Valuation of assets

Week 3:

- Timing and Scale in Project Appraisal
- Inflation and exchange rates
- Integrated analysis of projects

2

COURSE OUTLINE (2)

Week 4:

- Project finance: Debt finance; Cost of equity
- Applied statistics; Risk analysis and Risk management

Week 5:

- Review and Midterm Quiz

3

COURSE OUTLINE (2)

Week 7:

- Applied welfare economics & Harberger's three postulates
- Economic prices of non-traded goods

Week 8:

- Economic prices of traded goods
- Economic cost of foreign exchange, capital and labor

Week 9:

- Distributional impacts of projects
- Environmental Impact/Public Private Partnerships
- Course Review

4

COURSE OUTLINE (3)

Week 10:

- Review and Final Examination

Course Assessment:

• Problem Sets	40%
• Quiz 1	25%
• Quiz 2	35%
Total	100%

5

- Sign up for the ASEUprojectappraisal-subscribe@yahoogroups.com Under Comments; please write "Roy Kelly". You will then be accepted into the group.
- No Make Up Classes—if you miss a class, then get notes, announcements from classmates
- Learning by Doing! Learn Together, Work Together, but hand in separately. Free Riders don't Learn Much.
- Honest and professional behavior is critical. Help each other; but hand in own work. Cheating, copying, plagiarizing will be reported.

6

Project Appraisal Objectives

- To direct resources to the best possible uses
- To justify decisions in a transparent manner
- To think about alternatives that might be more efficient
- Serves as a management tool for decision making and monitoring
- Allows the government to forecast better multiyear budgets

7

Objectives (cont.)

- To formulate projects for Central and Subnational levels, Donors and Bank funding
- To develop models for negotiation with contractors, service providers, different agencies in government
- For assessing cost recovery, subsidy level and for regulation in some cases

8

Objectives (Contd.)

- To examine projects/programs from the point of view of various stakeholders (owner, sponsoring department, banks and other funding agencies, affected parties, and the entire economy)
- To assess the likely sources and magnitude of risks and redesign the project/program to reduce risks and satisfy the requirements of various stakeholders

9

Scope of Project/Program Appraisal

*In a nutshell, project appraisal and program evaluation is **not only about accepting or rejecting a project/program**; it is more of a **management tool for decision making** in a transparent manner, monitoring and successful implementation of projects and programs thereby **to maximize the benefits of public sector investments***

KEY ISSUE:

How can Azerbaijan ensure that government revenues will generate the maximum social and economic benefits to the Azeri people.

Integrated Appraisal/Evaluation

The three main components are:

- Financial Analysis
- Economic Analysis
- Distributive (Stakeholder) and Risk Analysis

11

Financial Analysis

- Financial analysis to see if a particular project or program is financially viable and, if not, what is the burden on the budget - both initial and recurrent
- Examine alternative sources and costs of financing
- Assess the value of a project (firm) that could serve as the base value for privatization of a public sector company

12

Economic Analysis

- Economic analysis to answer the question: does the proposal make sense from the point of view the economy (society)? For public sector projects/programs this could be the basis for “yes-no” decision
- Assess the costs and benefits of externalities (pollution, deforestation, health etc.)
- Economic prices indicate the right level of user fees

13

Stakeholder and Risk Analysis

- Stakeholder or distributive analysis asks the question “who gains and who loses” and is relevant for the politics or the sustainability
- Special attention may be paid to projects/ programs if they meet some basic needs
- Risk analysis allows assessment of risk and its management through redesigning, changing ownership or participation and contracting

14

3 Stage Approach for Analysis

1. Financial Appraisal

Core building block for financing project Usually focus is on suppliers of equity capital (owners) and debt capital (bankers, etc), but includes government tax or budget financing for pure public project

2. Economic Appraisal

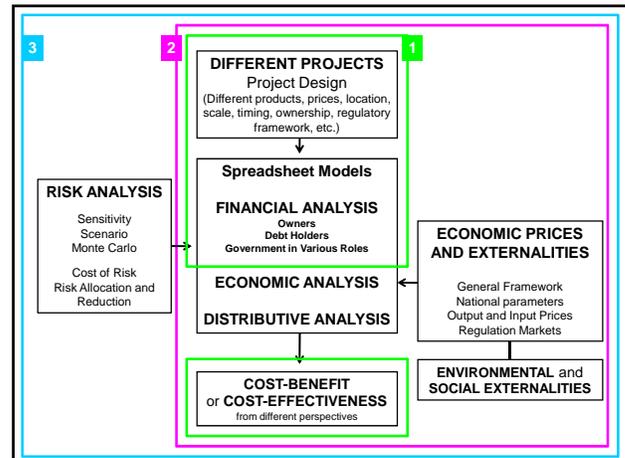
Ultimate basis for public decision making – aggregate benefits to economy

3. Risk and Distributive Appraisal

Critical to project design:

- Identify winners and losers
- Incentives of participants to undertake and sustain project distribution of benefits and risks

15



PROJECT APPRAISAL: ANALYTICAL FRAMEWORK

Prof. Roy Kelly
Sanford School of Public Policy, Duke University
(roykelly@duke.edu)

Azerbaijan State Economics University (ASEU)
Spring 2010

1

The Appraisal of Investment Projects

I. The Role of Project Appraisal

- To develop and formulate projects
- To stop bad projects
- To prevent good projects from being destroyed
- To determine if components of projects are consistent with objectives
- To assess the sources and magnitude of risks and how to reduce them

Management Tool for decisionmaking to maximize benefits of public sector investments

II. Stages in Project Appraisal

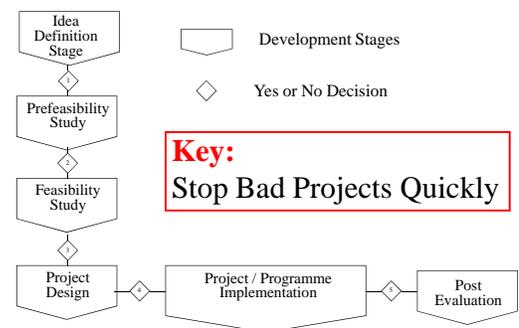
Why should a project evaluation be done in stages?

- Idea and Project Definition
- Pre-Feasibility Study
- Feasibility Study
- Detailed Design
- Project Implementation
- Project Post Evaluation, Audit, Impact Evaluation

Why should a project evaluation be done in stages?

3

Stages in Project Development and Analysis



4

A. Idea and Project Definition

- **Key questions**
 - Where is the demand?** What factors are typically important to justifying new investments in a sector?
 - Is this project consistent with the country's strategy?**
 - Why not involve the private sector?
 - What depth of analysis is required or justified to take an investment decision?

5

B. Pre-Feasibility Study

- Examines overall potential of project: screening of alternatives with potential for net benefits; rejecting bad projects
- Should maintain same quality of information across all variables
- Wherever possible, should use **secondary information**
- Biased information better than mean values
- Use sensitivity analysis

Key questions:

- Is this project financially and economically feasible throughout the project's life?
- What are the key variables that might affect project viability in the future?
- Have appropriate choices been made about technology, scale, timing, organization, ownership, etc?
- What are the sources of risk? How can risk be reduced?

6

C. Feasibility Study

- Focus is on improving accuracy of the key variables
- Alternatives for reducing risk are examined in detail
- Some primary data may be needed

Key questions:

- Is project financially attractive to all interested parties in activity?
- What is level of uncertainty of key variables?
- Can final decision for approval be taken?

7

Building Blocks and Modules of Pre-Feasibility & Feasibility Studies

Why break study into modules?

Building Blocks

- A. Demand Module
- B. Technical/Engineering (including environmental factors) Module
- C. Management and Manpower Module

Analysis Modules

- A. Financial/Budget Module
- B. Economic Module
- C. Environmental Assessment Module
- D. Stakeholder and Sustainability Module
- E. Risk Management Module

8

A. Financial Module

- Integrate financial and technical variables from demand module, technical module, and management module
- Construct cash flow profile of project
- Identify key variables by doing sensitivity analysis for economic and social appraisal

Key questions:

- a. Is the project financially viable?
- b. What are sources and costs of financing?
- c. What are minimum cash flow requirements for each stakeholder?
- d. What can be adjusted to satisfy each of the stakeholders?

9

B. Economic Module

- Examine the project using the whole country as the accounting entity
- Evaluate externalities including environmental aspects
- Use accounting and microeconomics to measure costs and benefits.

Key questions:

- a. What size is the difference between financial and economic values for a variable?
- b. What causes these differences: Taxes, subsidies, price control, other policies (distortions)?
- c. Is the project economically viable?
- d. What user fees can be charged from consumers?

10

C. Environmental Assessment Module

- Environmental Assessment augments Economic Analysis
- Identify Environmental Impacts and Risks
- Where possible, Quantify the Environmental Impacts

Key questions:

- a. What are the likely environmental impacts from undertaking project?
- b. What is the cost of reducing the negative impact?
- c. What are the likely environmental risks remaining after technical measures are taken to reduce these risks?
- d. Are there alternative ways of supplying the good or service from the project without incurring these environmental costs? What are the costs of these alternatives?

11

D. Stakeholder and Sustainability Analysis

- Distributive appraisal: Who gains and Who loses - income, cost, and fiscal impacts on various stakeholders
- Identify and quantify extra-economic impacts of project
- Identify impact of project on achieving basic needs objectives

Key Questions:

- a. In what ways does project generate beneficial and costly impacts on stakeholders?
- b. Who benefits and who pays the costs?
- c. What impact will the project have on basic needs?

12

E. Risk Analysis and Management

- Identify major sources, types and magnitudes of risk and who will bear the burden of these risks
- Impact of risk on attractiveness and sustainability of project
- Redesign project to redistribute and reduce risks and improve probabilities of favorable outcomes through changes in ownership or participation, use of insurance, financial and commodity markets, and contract or concession arrangements

Key questions

- What are risks and who bears them?
- What are the impacts of risk on overall project and on particular stakeholders?
- Can insurance, financial or commodity market instruments be used to ameliorate risks?
- Can risks be redistributed or reduced? If so, how can this be managed?

13

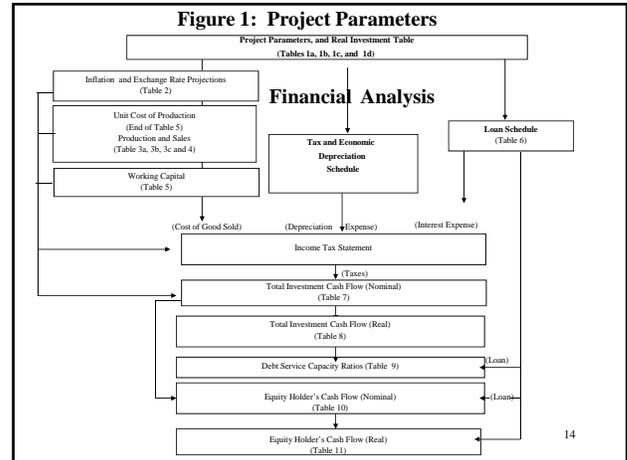


Figure 2 : Economic Analysis

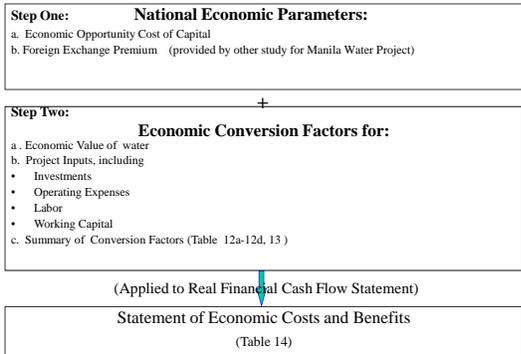


Figure 3: Distribution Analysis

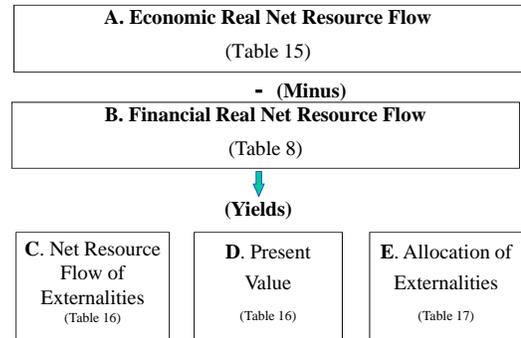


Figure 3: Distribution Analysis (Continued)

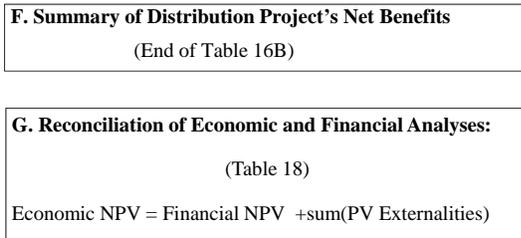
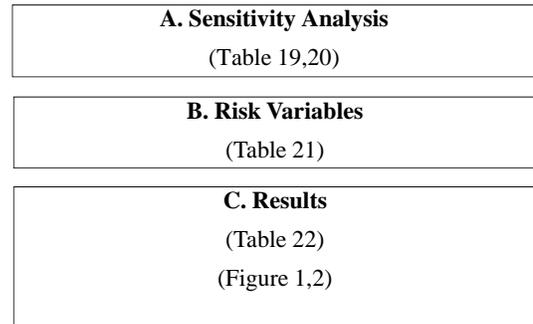


Figure 4: Risk Analysis



TIME VALUE OF MONEY AND INVESTMENT SELECTION CRITERIA

Prof. Roy Kelly
Sanford School of Public Policy, Duke University
(roykelly@duke.edu)

Azerbaijan State Economics University (ASEU)
Spring 2010

1

Alternative Investment Criteria and Cost Effectiveness

- Different analysts and organizations use criteria to assess projects, that have some rationality. In the following slides, different criteria are assessed and compared.
- Situations are identified where some of the criteria give inappropriate or inconsistent results.

2

Four Alternative Investment Decision Criteria

• Net Present Value (NPV)

$$NPV_r^0 = \frac{B_0 - C_0}{(1+r)^0} + \frac{B_1 - C_1}{(1+r)^1} + \frac{B_2 - C_2}{(1+r)^2} + \dots + \frac{B_7 - C_7}{(1+r)^7}$$

- Internal Rate of Return (IRR)
- Benefit-Cost Ratio (BC Ratio)
- Pay-Back Period

3

Alternative Investment Criteria

Basic Concepts:

A. Discounting

- Recognizes time value of money
 - a. Funds when invested yield a return
 - b. Future consumption worth less than present consumption
- $$NPV_r^0 = (B_0 - C_0)/(1+r)^0 + (B_1 - C_1)/(1+r)^1 + \dots + (B_n - C_n)/(1+r)^n$$

B. Cumulative Values

- The calendar year to which all projects are discounted to is important
- All mutually exclusive projects need to be compared as of same calendar year

If $NPV_r^1 = (B_0 - C_0)(1+r)^1 + (B_1 - C_1) + \dots + (B_n - C_n)/(1+r)^{n-1}$ and

$$NPV_r^3 = (B_0 - C_0)(1+r)^3 + (B_1 - C_1)(1+r)^2 + (B_2 - C_2)(1+r) + (B_3 - C_3) + \dots + (B_n - C_n)/(1+r)^{n-3}$$

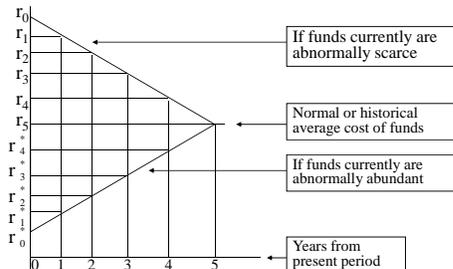
Then $NPV_r^3 = (1+r)^2 NPV_r^1$

4

Alternative Investment Criteria: Basic Concepts (Contd)

C. Variable Discount Rates

- Adjustment of Cost of Funds Through Time



• For variable discount rates r_1 , r_2 , & r_3 in years 1, 2, and 3, the discount factors are, respectively, as follows:

$$1/(1+r_1), 1/[(1+r_1)(1+r_2)] \text{ \& } 1/[(1+r_1)(1+r_2)(1+r_3)]$$

5

Weighted Average Cost of Capital (WACC)

- Discount rate reflects the “opportunity cost” of consumption today versus consumption tomorrow
- Opportunity cost can differ for debt and equity
- Discount rate for debt is equal to the interest rate for the loan
- Discount rate for equity is equal to the “opportunity cost of funds” to the equity owner: It may be higher than the loan interest rate.
- Discount rate to be used is the “weighted average cost of capital” (WACC)

6

Example of Weighted Average Cost of Capital (WACC)

$$r_A = \frac{D}{D+E} r_D + \frac{E}{D+E} r_E$$

D = amount of Debt owed by the firm
 E = Equity, market value;
 r_D = return (expected) on the firm's debt
 r_E = return (expected) on the firm's equity

Example 1:

D = 2000 E = 2000 Total=4,000 $r_D = 16\%$ $r_E = 20\%$

$$(2000/4000 * .16) + (2000/4000 * .20) = 18\% = r_A$$

Example 2:

D = 1000 E = 3000 Total=4,000 $r_D = 16\%$ $r_E = 20\%$

$$(1000/4000 * .16) + (3000/4000 * .20) = 19\% = r_A$$

7

Alternative Investment Criteria

First Criterion: Net Present Value (NPV)

- What does net present value mean?
- Measures change in wealth or net worth or value of equity: **NPV > 0 means increase in value of firm**
 - **Basic target of increasing shareholder value**
 - NPV of 0 implies project has same return as the opportunity cost of funds
- Use as a decision criterion to answer following:
 - a. When to reject projects?
 - b. When you have a budget constraint?
 - c. When you need to compare mutually exclusive projects?

8

Net Present Value Criterion

a. When to Reject Projects?

Rule:

“Do not accept any project unless it generates a positive net present value when discounted by the opportunity cost of funds”

Examples:

- Project A: Present Value Costs \$1 million, NPV + \$70,000
- Project B: Present Value Costs \$5 million, NPV - \$50,000
- Project C: Present Value Costs \$2 million, NPV + \$100,000
- Project D: Present Value Costs \$3 million, NPV - \$25,000

Result: Only projects A and C are acceptable. The country/economy is made worse off if projects B and D are undertaken.

9

Net Present Value Criterion (Contd)

b. When You Have a Budget Constraint?

Rule: *“Within the limit of a fixed budget, choose that subset of the available projects which maximizes net present value”*

Example:

If budget constraint is \$4 million and 4 projects with positive NPV:

- Project E: Costs \$1 million, NPV + \$60,000
- Project F: Costs \$3 million, NPV + \$400,000
- Project G: Costs \$2 million, NPV + \$150,000
- Project H: Costs \$2 million, NPV + \$225,000

Result: Combinations FG and FH are impossible, as they cost too much. EG and EH are within the budget, but are dominated by the combination EF, which has a total NPV of \$460,000. GH is also possible, but its NPV of \$375,000 is not as high as EF. What if Project E has NPV = -\$60,000?

10

Net Present Value Criterion (Contd)

c. When You Need to Compare Mutually Exclusive Projects?

Rule:

“In a situation where there is no budget constraint but a project must be chosen from mutually exclusive alternatives, we should always choose the alternative that generates the largest net present value”

Example:

Assume that we must make a choice between the following three mutually exclusive projects:

- Project I: PV costs \$1.0 million, NPV \$300,000
- Project J: PV costs \$4.0 million, NPV \$700,000
- Project K: PV costs \$1.5 million, NPV \$600,000

Result:

Projects J should be chosen because it has the largest NPV.

11

Alternative Investment Criteria

Second Criterion: Internal Rate of Return (IRR)

- IRR is the discount rate (K) at which the present value of benefits are just equal to the present value of costs for the particular project

$$\sum_{t=0}^T \frac{B_t - C_t}{(1+K)^t} = 0$$

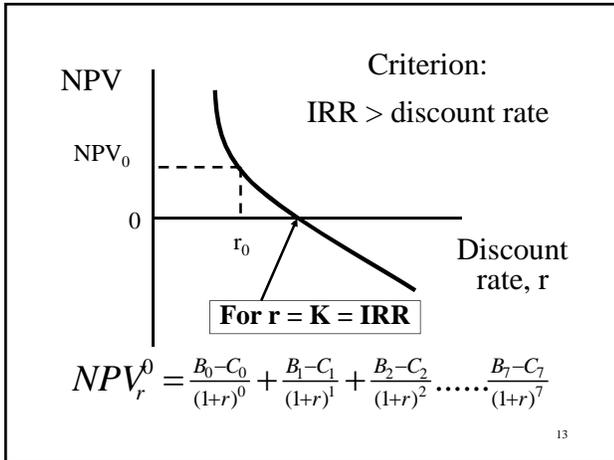
Note: the IRR is a mathematical concept, not an economic or financial criterion

Common uses of IRR:

- a. If the IRR is larger than the cost of funds then the project should be undertaken
- b. Often the IRR is used to rank mutually exclusive projects. The highest IRR project should be chosen

Note: An advantage of the IRR is that it only uses information from the project

12



Difficulties with the Internal Rate of Return Criterion

First Difficulty: Multiple rates of return for project

Solution 1: $K = 100\%$; $NPV = -100 + 300/(1+1) + -200/(1+1)^2 = 0$
 Solution 2: $K = 0\%$; $NPV = -100 + 300/(1+0) + -200/(1+0)^2 = 0$

No unique solution (IRR) when investments occurs in stages.
Example: Natural Resource mining projects with multiple investments

14

Difficulties With The Internal Rate of Return Criterion
(Contd)

Second difficulty: Projects of different sizes and also strict alternatives

Year	0	1	2	3	∞
Project A	-2,000	+600	+600	+600	+600	+600	+600
Project B	-20,000	+4,000	+4,000	+4,000	+4,000	+4,000	+4,000

NPV and IRR provide different Conclusions:

Opportunity cost of funds = 10%

$NPV_A^0: 600/0.10 - 2,000 = 6,000 - 2,000 = 4,000$
 $NPV_B^0: 4,000/0.10 - 20,000 = 40,000 - 20,000 = 20,000$
 Hence, $NPV_B^0 > NPV_A^0$

$IRR_A: 600/K_A - 2,000 = 0$ or $K_A = 0.30$
 $IRR_B: 4,000/K_B - 20,000 = 0$ or $K_B = 0.20$
 Hence, $K_A > K_B$

15

Difficulties With The Internal Rate of Return Criterion
(Contd)

Third difficulty: Projects of different lengths of life and strict alternatives (Two types of plantations)

Opportunity cost of funds = 8%

Project A: Investment costs = 1,000 in year 0
Benefits = 3,200 in year 5

Project B: Investment costs = 1,000 in year 0
Benefits = 5,200 in year 10

$NPV_A^0: -1,000 + 3,200/(1.08)^5 = 1,177.86$
 $NPV_B^0: -1,000 + 5,200/(1.08)^{10} = 1,408.60$
 Hence, $NPV_B^0 > NPV_A^0$

$IRR_A: -1,000 + 3,200/(1+K_A)^5 = 0$ which implies that $K_A = 0.262$
 $IRR_B: -1,000 + 5,200/(1+K_B)^{10} = 0$ which implies that $K_B = 0.179$
 Hence, $K_A > K_B$

16

Difficulties With The Internal Rate of Return Criterion
(Contd)

Fourth difficulty: Same project but started at different times

Project A: Investment costs = 1,000 in year 0
Benefits = 1,500 in year 1

Project B: Investment costs = 1,050 in year 5
Benefits = 1,600 in year 6

$NPV_A^0: -1,000 + 1,500/(1.08) = 388.88$
 $NPV_B^0: -1,050/(1.08)^5 + 1,600/(1.08)^6 = 293.66$
 Hence, $NPV_A^0 > NPV_B^0$

$IRR_A: -1,000 + 1,500/(1+K_A) = 0$ which implies that $K_A = 0.5$
 $IRR_B: -1,050/(1+K_B)^5 + 1,600/(1+K_B)^6 = 0$ which implies that $K_B = 0.52$
 Hence, $K_B > K_A$

17

When is IRR valid?

- IRR can be used to **compare investments** when they have the same:
 - Scale/size
 - Timing
 - Term/length
 - Pattern of benefits
- **Rate of return** is a useful summary measure of the *efficiency of a unit of investment over a unit period*, but has **limitations in seeking maximum NPV**

18

Alternative Investment Criteria

Third Criterion: Benefit-Cost Ratio

Benefit-Cost Ratio (R) = Present Value Benefits/Present Value Costs

$$R = \frac{PVB}{PVC}$$

Basic rule:

If benefit-cost ratio (R) > 1, then the project should be undertaken.

Problems?

Sometimes it is not possible to rank projects with the Benefit-Cost Ratio

- Mutually exclusive projects of different sizes
- Mutually exclusive projects and recurrent costs subtracted out of benefits or benefits reported gross of operating costs
- Not necessarily true that $R_A > R_B$ that project "A" is better

19

Benefit-Cost Ratio (Cont'd)

First Problem: The Benefit-Cost Ratio Does Not Adjust for Mutually Exclusive Projects of Different Sizes.

For example:

Project A: PV⁰ of Costs = \$5.0 M,
PV⁰ of Benefits = \$7.0 M
NPV_A = \$2.0 M **$R_A = 7/5 = 1.4$**

Project B: PV⁰ of Costs = \$20.0 M,
PV⁰ of Benefits = \$24.0 M
NPV_B = \$4.0 M **$R_B = 24/20 = 1.2$**

According to the Benefit-Cost Ratio criterion, project A should be chosen over project B because $R_A > R_B$, but the NPV of project B is greater than the NPV of project A. So, *project B should be chosen*

20

Benefit-Cost Ratio (Cont'd)

Second Problem: The Benefit-Cost ratio does not adjust for mutually exclusive projects and recurrent costs subtracted out of benefits or benefits reported as gross of operating costs.

For example if using Net rather than Gross Analysis:

(often sales are net of freight, gross of freight; FOB prices include/exclude cost to border)

Project A: Total Costs = \$5.0 M
Recurrent Costs = \$1.0 M
(i.e. Fixed Costs = \$4.0 M) PV⁰ of Gross Benefits = \$7.0 M
 $R_A = (7-1)/(5-1) = 6/4 = 1.5$ (compare with 1.4 above)

Project B: Total Costs = \$20.0 M
Recurrent Costs = \$18.0 M
(i.e. Fixed Costs = \$2.0 M) PV⁰ of Gross Benefits = \$24.0 M
 $R_B = (24-18)/(20-18) = 6/2 = 3$ (compare with 1.2 above)

If Gross: $R_A > R_B$ while if Net: $R_A < R_B$ (thus, depends on whether gross or net)
Hence, project B should be chosen over project A under Benefit-Cost Criterion.

21

Benefit-Cost Ratio (Cont'd)

THUS:

The Benefit-Cost Ratio CANNOT be used to rank projects

Although IRR and B/C ratios are useful conceptual tools, it is important to understand what the ratios mean.

They can lead to wrong choices for project selection.

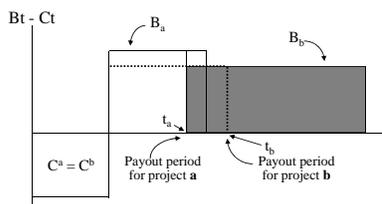
22

Alternative Investment Criteria

Fourth Criterion: Pay-Out or Pay-Back Period

- The number of years before the benefits (discounted) are sufficient to repay the cumulative costs (discounted)
- Project with shortest payback period is preferred by this criteria
- Can reject high NPV projects with delayed pay-out; commonly used in unstable economic environments
- Useful in designing level of a concession or BOOT arrangement

Comparison of Two Projects With Differing Lives Using Pay-Out Period



23

Summary

- **The most reliable criteria is the NPV.** Only reliable criteria for (i) optimal design of a project and (ii) choice of project where mutually exclusive options
- The other criteria can be used; for example, banks use the IRR to compare more easily projects in different regions, or the irrigation department might use the B/C ratio, but analysts should be aware of the potential inconsistencies.

24

Cost Effectiveness

Cost Effectiveness Analysis

- An appraisal and program monitoring technique used primarily in social programs, projects and policies (health, nutrition, education) where identification and quantification of benefits in money terms is not straightforward but, at the same time, the desirability of the activity is not in question.
- The objective is to compare costs per unit of outcome of two programs for purposes of capital budgeting.

25

Application of Cost Effectiveness

- This approach also very useful where aim is to choose from a set of alternative technologies/approaches that will provide the same service.
- For instance choosing from two school systems that give same education benefits (centralized schools that require bus transportation and more expensive smaller schools to which students can walk), two systems of electricity generation (thermal versus hydro), or two park sites providing same recreational services (one where old warehouses have to be demolished and the other one requiring land fill), two types of court systems with same disposal of cases (more court rooms at the headquarters or mobile courts) etc.

26

Cost Effectiveness (Contd.)

- Analysis considers only the costs of two or more alternatives treating benefits as identical. Focus is on the question of how to minimize costs for undertaking a particular activity.
- The selection criterion is “choose the alternative that has the lowest present value of costs (PVC)”. Again the outcome may be a function of the rate of discount and may switch with change in discount rate.
- Project/program/policy analysis involves steps similar to those in case of setting up the normal investment appraisal except that the benefits part is omitted and the focus is on setting up the costs part right.

27

CONSTRUCTING PROJECT CASH FLOWS

Prof. Roy Kelly
Sanford School of Public Policy, Duke University
(roykelly@duke.edu)

Azerbaijan State Economics University (ASEU)
Spring 2010

1

Construction of investment project cash flows for decision making: OVERVIEW

- Construction of cash flows over project life cycle
Options:
 - New investments
 - Replacements, expansions, mergers -- use of existing assets or resources
- Cash flows from different investment perspectives (different points of view and interest)

2

Basic Principles

- **Cash flows for decision making: the issue of the opportunity cost**
 - Cost-benefit appraisal of decisions aims at choosing investments that yield net benefits for investors
 - All resources used as result of investment decision must be charged to the project as investors are forgoing value that could be earned on resources in alternative uses – concept of “**opportunity cost**”
 - Not all “cash flows” are actual flows of cash through an account. Where existing resources are used, opportunity cost or the forgone “cash flows” are charged to the investment for using these resources
 - Existing land, building and machinery
 - Time of owner-manager of business

3

Construction of the Cash Flow Statement for Project Profile or Life Cycle

- Investment projects can be simple or complex
 - **Simple investment**: single capital purchase; single benefit stream – similar to simple financial asset such as a term deposit
 - Purchase farmland to rent to tenant farmers
 - Purchase motor vehicle to operate as a taxi
 - **Complex investment**
 - Agricultural processing plant, mine, public utility, manufacturing facility, waste disposal facility
 - Complex investment and operating phases over many years with multiple revenue and expenditure items
 - Requires detailed investment and operating plans

4

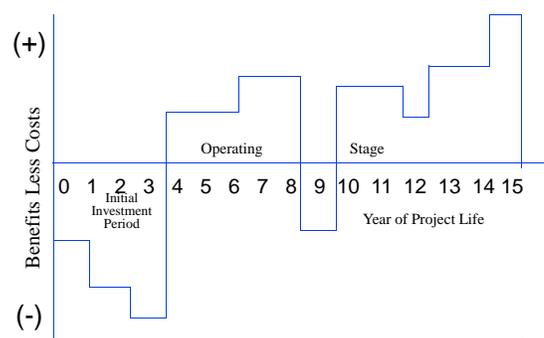
Simple investment in farmland



Discount rate or opportunity cost of funds	= 10%
Annual rental receipts from land	= 100
Expected gross benefits	= 100/10%
	= 1,000
Cost of land	= 850
Expected net benefit	= 150

5

Complex investment: Resource or Cash Flow Profile of Project



6

Construction of the Cash Flow Statement for Project Profile or Life Cycle

A. Investment Plan

- Need to reconcile timing of technical construction plans with the financing plan, demand module, and manpower availability

B. Operating Plan

- Need to reconcile market module with manpower module and minimum cash flows for operation of project

7

Components Of Project Cash Flows

- **Treatment of different revenue and expenditure items**
 - Cash flows *versus* Profit and Loss
 - Profit and loss only captures flows accruing over a single time period
- **Treatment of price levels over project time horizon**
 - Cash flows capture complex pattern of all revenues and costs over life of project; discounting future flows allows consolidation into a point of time for decision making
 - It takes into account the general price inflation, real price changes and exchange rate fluctuations
 - Cash flow approach adopted in this methodology - due to Prof. Arnold Harberger

8

Introduction to Valuation of Cash Flows

- **Basic issue:** How to evaluate complex streams of net cash flows expected from an investment project? How can these cash flows be aggregated to judge whether a net gain is expected? Is the value of funds received in the future the same as funds received in the present?
- Problem of **time value of money** received or disbursed in different time periods.
- Need concepts of **compounding** to accumulate funds into future, and **discounting** to bring future funds received to present values at **opportunity cost of funds**

Impacts of inflation, risk, and taxation on different investment decision makers will be addressed later.

9

Key Variables in Cash Flow Statement

Interest During Construction Versus
Financing Costs of Debt During Construction Period

a. Interest During Construction

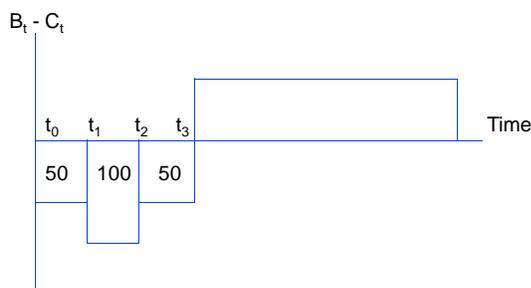
- Concept of opportunity cost when investment covers more than one period
- Is it an investment cost?

Actual Financing Costs of Debt during Construction: Alternative situations:

- Owner's point of view
 - Interest paid
 - Interest accrued but not paid
- Point of view of total investment
 - Issue of 'interest during construction' does not arise since debt and debt repayment are not part of cash flow.

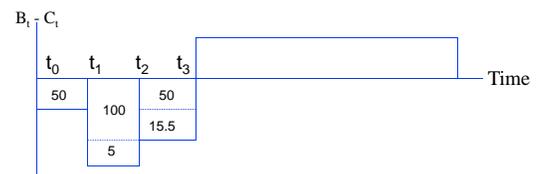
10

An Illustration: Measuring Investment Costs What Is The Total Cost of a Three Year Investment?



11

What is the Total Cost of a Three Year Investment? (Contd)



Opportunity Cost of Funds = 10%

Investment Costs:

- Simple Sum = \$200
- At $t_0 = 50/1.1 + 100/(1.1)^2 + 50/(1.1)^3$
= 45.45 + 82.64 + 37.57 = \$165.66
- At $t_3 = 50 + 100(1.1) + 50(1.1)^2 = \220.50

Interest during construction is equal to \$20.50

12

b. Treatment of depreciation

- Why have the concept of depreciation expense?
- Why is depreciation expense not a cash flow item?
- Use of depreciation expense in calculating cash flow profile:
 - To estimate taxes (tax depreciation)
 - To estimate residual or liquidation values of assets (economic depreciation)

13

c. Cash Receipts Versus Sales

$$\begin{aligned}
 & \text{Sales for Period}_1 \\
 & + \\
 & \text{Accounts Receivable (debtors) for Beginning of Period}_0 \\
 & - \\
 & \text{Accounts Receivable (debtors) for End of Period}_1 \\
 & \hline
 & = \text{Cash Receipts for Period (Inflow)}_1
 \end{aligned}$$

For Example:

Sales₁ = 10,000
 Accounts Receivable₀ = 5,000
 Accounts Receivable₁ = 8,000
 Receipts = 10,000 + (5,000 - 8,000) = 7,000
 (e.g. Payment of electricity dues, water charges etc.)

14

d. Cash Expenditures Versus Purchases

$$\begin{aligned}
 & \text{Purchases for Period}_1 \\
 & + \\
 & \text{Accounts Payable at Beginning of Period}_0 \\
 & - \\
 & \text{Accounts Payable at End of Period}_1 \\
 & \hline
 & = \text{Cash Expenditures for Period (Outflow)}_1
 \end{aligned}$$

For Example:

Purchases₁ = 11,000
 Accounts Payable₀ = 6,000
 Accounts Payable₁ = 4,000
 Expenditures = 11,000 + (6,000 - 4,000) = 13,000
 (e.g. Payment of telephone charges, petrol/oil)

15

e. Cash Held to Carry Out Transactions

- Cash held to carry out transactions is a use of cash
- Increases in cash holdings is a cash outflow
- Decreases in cash holdings is a cash inflow

For Example:

Desired stock of cash = 20% of sales

Year	0	1	2	3	4
Sales	2000	2500	3200	5000	0
Desired Cash	400	500	640	1000	0
Impact on Net Cash Flow	-400	-100	-140	-360	+1000

16

f. Accounting for Working Capital

- Working Capital = Cash + Accounts Receivables
 - Accounts Payables + Inventories
 + Prepaid Expenses - Advances and other
 Accrued Current Liabilities
- In this approach, no further calculation needed to determine the working capital except for cash
- Critical importance to properly plan for adequate financing and accounting for working capital for survival of projects
- Often need for working capital understated in project proposals including donor funded projects

17

g. Cash Held to Carry Out Transactions

- Cash held to carry out transactions is a use of cash
- Increases in cash holdings is a cash outflow
- Decreases in cash holdings is a cash inflow

For Example:

Desired stock of cash = 20% of sales

Year	0	1	2	3	4
Sales	2000	2500	3200	5000	0
Desired Cash	400	500	640	1000	0
Impact on Net Cash Flow	-400	-100	-140	-360	+1000

18

POINTS OF VIEW, ASSET VALUATION AND DEBT SERVICE RATIOS

Dr. D.N.S. Dhakal
Senior Fellow
Sanford School of Public Policy, Duke University

Azerbaijan State Economics University (ASEU)
Spring 2010

0

FINANCIAL MODELLING FROM DIFFERENT POINTS OF VIEW

1

Alternative Points of View

- Critical in analysis to evaluate financial outcome of project from the point of view of each interested party
- Conventional analysis considers:
 - a. Point of view of owner
 - b. Point of view of all investors combined
(Banker's point of view or total investment point of view)
 - c. Point of view of economy

Other Perspectives

- Point of view of government budget
- Point of view of suppliers of inputs
- Point of view of downstream processors
- Point of view of competitors

2

Analyses of Investment Decisions From Alternative Points of View

Type of Analysis

Viewpoint:	Financial (I)	Economic (II)	Stakeholder (III)	Basic Needs (IV)
Banker (Total Investment)	Yes	No/Yes	Yes	No
Owner	Yes	No/Yes	Yes	No
Government Budget Office	Yes	No	Yes	No
Country	No	Yes	Yes	Yes

3

Determining the Financial and Economic Values of Existing Assets for Cash flows

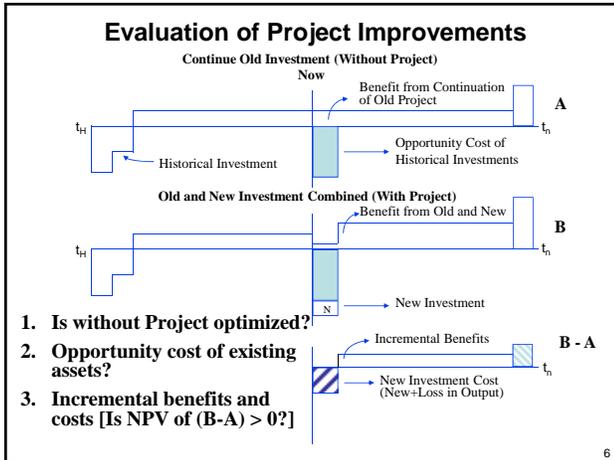
4

FINANCIAL AND ECONOMIC VALUES OF EXISTING ASSETS

Issues

- Most projects are expansions or improvements on existing projects
- Need to determine opportunity cost of existing assets that will be employed in upgraded or expanded facility
- Need to define base case without project
- Existing facility must be first optimized before comparing with expanded project

5



	Inflow	Net Cash Flow	NPV
Project			IRR
New Project	Outflow		ADSCR
			LLCR
Expansion or Rehabilitation			
- Incremental Analysis:			Project
- Need valuation of assets			

7

- ### COSTS ASSOCIATED WITH CONTINUING A PROJECT
- **Historical Costs**
 - If historical cost of asset is different from its current market value, the historical cost should not be used in the appraisal of the project
 - Need to determine opportunity costs
 - **Opportunity Costs**
 - What is the opportunity cost of the continued use of assets of existing facility?
 - Key factor in rehabilitation of projects
 - Net Replacement Cost, In-Use Value or Liquidation Value?
- 8

- ### Sunk Costs
- Sunk Costs = (Net Historical Book Values) - (Greater of Liquidation or Net Replacement Cost)**
- If negative, then there has been a financial capital gain.
 - Sunk costs are not an economic resource cost.
 - Unpaid debt backed by existing (encumbered) assets can affect investment decision.
 - Such debt will affect the cash flow of an "improved" project and thus may indirectly alter the economic returns from incremental investments.
 - Even if existing assets may now be sunk costs, their financial obligation cannot be ignored if the same legal entity is to be continued.
- 9

Choosing Between Liquidation, In-Use and Net Replacement Cost Values as Measures of Opportunity Cost

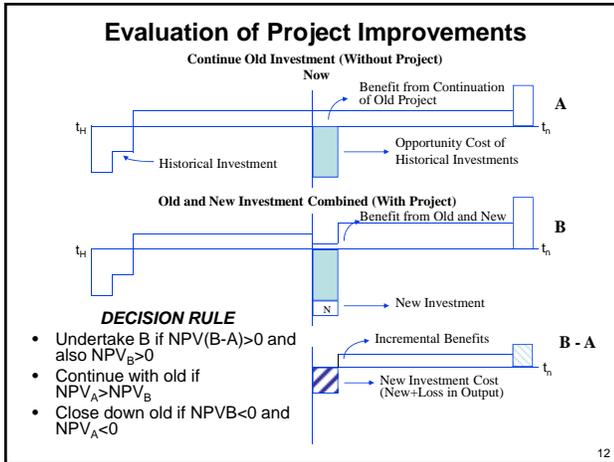
Net Replacement Cost (NRC): is the cost of replacing the plant as is in its present state with all equipment in its present condition.

Liquidation Value (LV): refers to the net value of the different components of the company after deducting all liquidating costs.

In-Use Value (IUV): refers to the net replacement cost plus any additional values resulting from intangible assets such as good will, brand name, etc. – *Not recommended because valuation of intangible assets very subjective.*

10

- ### Decision Criteria in deciding which value to use as opportunity cost of existing assets when considering an expansion project
1. If NPV of without case using NRC as opportunity cost > 0, then use Net Replacement Cost as opportunity cost of existing assets with case
 2. If NPV using NRC as opportunity cost < 0, then estimate NPV of with or combined case using Liquidation Value (LV) as opportunity cost of existing assets.
- 11



Treatment of Land in Cost-Benefit Analysis

- Cases:
 - Financial analysis if Land purchased or rented from free market as input to project.
 - Financial analysis if land already owned by enterprise doing project.
 - Financial analysis if land can be obtained only if a specific project is undertaken.
 - Economic analysis, and the economic opportunity cost of land.

13

Opportunity Cost of Land

- In all cases, land has a cost to the project. There is an opportunity cost, either annual rental value or capital cost to project for time that it uses land
- In general, there is need to separate investment in land from the investment in project

Exceptions to general rules:

- If land availability is directly tied to doing the specific project, then capital gains or losses on land is a financial benefit or cost to the project placed on land
- Direct land improvement or destruction caused by project will affect residual land values at the end of the project

14

Alternative Ways of Including Cost of Land in Cash Flow of Project

A. Preferred Method: Rental Charge Approach

- Levy implicit rental charge each period as a cost. For example, if the annual rental value is 8% of current market value then:

Year	0	1	2	3	4	5
Land Rental		-8	-8	-8	-8	-8

- If anticipated real capital gains, then market rental rate (which will be lower to begin with) will increase overtime as real value of land increases.

B. Alternative Method: Capital Charge Approach:

- Assume no anticipated real capital gains and 100 is the initial purchase price of land.

Year	0	5
Land Investment	-100	+100

- Final year benefit should be different than 100 only if land physically improved or damaged.

15

Capital gain because of other factors than Project

- Capital gains on land largely due to infrastructure investment such as roads, electricity service, subways.
- Such capital gains are not related to the actual project for which we are using the land.

Example

- Purchase land for 100 million in year 0 but because of new road land is worth 500 million in year 10. If we are using the land to grow vegetables then opportunity cost of land in year zero is 100 million and this real (year 0 prices) value is retrieved in year 10 as a 100 million.

16

Capital loss because of Project

- If project causes land deterioration then the deterioration in land value is deducted from the initial value of land to find its residual value.

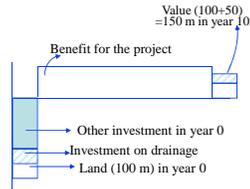
Example

- Farmer owns the land valued at 100 million in year 0 but because of build up of salt in the soil because of irrigation the worth of land falls to 60 million in year 10. Then the residual value of land in year 10 is a 60 million where 40 million is lost due to the salt build up in the soil.

17

Capital gain because of Project

- If project causes land through addition investment in a drainage system to increase in value then the depreciated value of these land improvement investments should be added to the initial value of land to find its residual value.
- Farmer owns the land valued at 100 million in year 0. Because it has an opportunity cost as long as it is used to grow vegetables the land is a cost to the vegetable growing project.
- Example
 - Farmer owns the land valued at 100 million in year 0 but an investment in new drainage system has a depreciated value of 50 m in year 10. Hence, the residual value of land in year 10 is (100 + 50) 150 million.

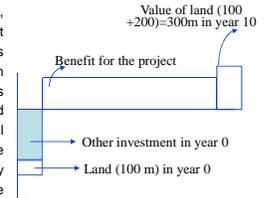


18

Capital Gain if Project Undertaken to Obtain Land

- If the government gives access to the purchase of land (at a price either below or equal to current market price) **ONLY** because the investors are willing to undertake a particular project. For example, the investor can obtain beach front land **ONLY** if he is willing to build a 5 star hotel, and run it for 10 years.
- In this case the private owner should consider any initial land subsidy as a financial benefit in the initial year of the project, and should include all capital gains in the residual value as a financial benefit of the project in its final year.
- Example

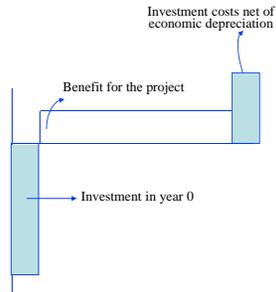
- The land is valued at 100 million in year 0, but the person must build a hotel and run it for 10 years. The real value of the land is assumed to grow by (100+200)=300 million in year 10. Because the government does not allow any alternative use of the land until the project is over, from the financial perspective of owner of hotel is that the final value of land accrues to him only because he is willing to undertake the project and run it for 10 years.



19

Determination of End Year Values

- Usually, the end of project does not mean end of life of business
- Often the life of the project extends beyond our ability to forecast future
- Both problems solved if we estimate values for assets in final year of analysis of cash flows
- Use same estimation procedures as for initial values of historical assets



20

Estimating and Use of Debt Service Ratios

21

Measuring the Debt Service Capacity of Project, Choice of Scale and Timing

- Debt Service Capacity Ratio is another criterion for evaluating the financial viability of a project
- A viable project must repay the principal and interest on the loan, as well as to bring a positive return on equity to the owners
- It is used by bankers who want to know:
 - the **annual debt service coverage ratio** (ADSCR) of a project on a year-to-year basis
 - a summary ratio, called **debt service capacity ratio** (DSCR) which is calculated as the present value of net cash flows over the present value of loan repayments from the current period to the end period of loan repayment
- Debt service capacity ratio** tells the banker if there is enough cash from the project to make bridge-financing even when some years have inadequate cash flows to serve the debt.

22

Calculation of Annual Debt Service Coverage Ratio:

$$ADSCR_t = \frac{\text{Annual Net Cash Flow}_t}{\text{Annual Debt Repayment}_t}$$

Calculation of Debt Service Capacity Ratio:

$$DSCR_t = \frac{PV(NCF_t : NCF_n)}{PV(\text{Debt Repayment}_t : \text{Debt Repayment}_n)}$$

Where: The Annual Net Cash Flow of the project is calculated before financing. The Annual Debt Repayment includes the interest expenses and principal repayment due in the specific year t of the loan repayment period. The last year of debt repayment is denoted as n .

23

Use of Debt Service Ratios

- A Project is considered for implementation:
 - Total Investment Costs: 2,000,000
 - Equity Funds: 1,000,000
 - Proposed Loan: 1,000,000
 - Start of Loan Repayment Year 1 (equal repayments)
 - Required Rate of Return on Equity: 20%
- Loan of 1,000,000 is given to project for 5 years at 15%:

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Net Cash Flow	-2,000,000	320,000	320,000	360,000	440,000	380,000	100,000	200,000	480,000	540,000	640,000
Debt Repayment		298,316	298,316	298,316	298,316	298,316					
ADSCR		1.07	1.07	1.21	1.47	1.27					

- Result: this project is not attractive to the banker since the ADSCR are low, meaning that the net cash flow may not be enough to meet the debt service obligations and to obtain the required Rate of Return on Equity.

24

How to improve the Debt Service Coverage Ratios?

- Decrease the interest rate on the loan
 - Decrease the amount of borrowing
 - Increase the duration of loan repayment
- Restructuring of the terms of the loan will make the ratios look better, and the project will become attractive to the Banker

25

1. Decrease the Interest Rate on the loan

Loan of 1,000,000 is given to project for 5 years at 1%:

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Net Cash Flow	-2,000,000	320,000	320,000	360,000	440,000	380,000	100,000	200,000	480,000	540,000	640,000
Debt Repayment		206,040	206,040	206,040	206,040	206,040					
ADSCR		1.55	1.55	1.75	2.14	1.84					

- Result: the ratios look better now, but it will normally require government guarantees or subsidies e.g. (IDA financing) to reduce interest rates – not easy to obtain

26

2. Decrease the amount of borrowing by increasing equity to 1.4 million

Loan of 600,000 is borrowed for 5 years at 15%:

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Net Cash Flow	-2,000,000	320,000	320,000	360,000	440,000	380,000	100,000	200,000	480,000	540,000	640,000
Debt Repayment		178,989	178,989	178,989	178,989	178,989					
ADSCR		1.79	1.79	2.01	2.46	2.12					

- Result: since the proportion of borrowing in the total investment decreases, the amount of annual repayment of the loan also becomes smaller, hence the ability to service the debt becomes more certain

27

3. Increase the duration of loan repayment

Loan of 1,000,000 is given to project for 10 years at 15%:

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Net Cash Flow	-2,000,000	320,000	320,000	360,000	440,000	380,000	100,000	200,000	480,000	540,000	640,000
Debt Repayment		199,252	199,252	199,252	199,252	199,252	199,252	199,252	199,252	199,252	199,252
ADSCR		1.61	1.61	1.81	2.21	1.91	0.50	1.00	2.41	2.71	3.21

- Result: Increasing the duration of debt repayment improves the ratios. The same amount of loan is repaid over more years
- However, in Year 6 and Year 7 the Net Cash Flows are inadequate to meet the debt repayment obligations

28

What is the solution to improve cash flows at the bad year?

- If project expects difficulties in a particular future year as the net cash flows are not enough to service the debt in that period(s).
- Questions:**
 - Should project maintain an Escrow Fund?
 - Is bridge financing a viable option?

29

Should project maintain an Escrow Fund?

Definitions:

- A fund established upon the requirement of the lenders to hold cash that can be used towards debt servicing.
- This fund restricts the payment of dividends.
- Typically contains between 12 and 18 months of debt service.
- Cash can be withdrawn from the escrow fund if the project's cash flow from operations does not cover the project's debt service requirements.

30

Is bridge financing a viable option?

- To find out if the bridge-financing is worth undertaking, we need to look at the cash flows and debt repayments over the remaining period of debt service.
- Debt Service Capacity Ratio (DSCR) is the appropriate criteria to use to determine if project finances for bridge-financing.
- The present values of net cash flows remaining till the end of debt repayment period, discounted at the loan interest rate, is divided by the present values of debt repayments remaining till the end of debt repayment period, also discounted at the loan interest rate. It needs to be substantially bigger than one, i.e. >1.7.

31

Use of Debt Service Capacity Ratios (DSCR)

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Net Cash Flow	2,000,000	320,000	320,000	360,000	440,000	380,000	100,000	200,000	480,000	540,000	640,000
Debt Repayments		199,252	199,252	199,252	199,252	199,252	199,252	199,252	199,252	199,252	199,252
ADSCR		1.61	1.61	1.81	2.21	1.91	0.50	1.00	2.41	2.71	3.21
NPV of NCF		2,052,134	1,991,954	1,922,747	1,797,159	1,560,733	1,357,843	1,446,519	1,433,497	1,096,522	640,000
NPV of Debt Repayments		1,150,000	1,093,360	1,028,224	953,318	867,176	768,112	654,189	523,178	372,515	199,252
DSCR		1.78	1.82	1.87	1.89	1.80	1.77	2.21	2.74	2.94	3.21

Results: Although the annual debt service ratios in Year 6 and Year 7 are very low, the ability of the project to generate cash in consequent years (DSCR) should be enough to obtain bridge-financing for these two critical years

32

INFLATION AND INVESTMENT ANALYSIS

Dr. D.N.S. Dhakal
Senior Fellow
Sanford School of Public Policy, Duke University

Azerbaijan State Economics University (ASEU)
Spring 2010

1

Inflation and Investment Appraisal

1. Inflation is the change in price level or price index

$$gP^e = ((P_1^t - P_1^{t-n}) / P_1^{t-n}) * 100$$

2. Real Prices

Prices that include inflation are nominal prices, those that do not include inflation are the real prices.

$$P_{iR}^t = P_i^t / P_I^t$$

Where P_{iR}^t = Real price of good (i) as of a specific period (t)

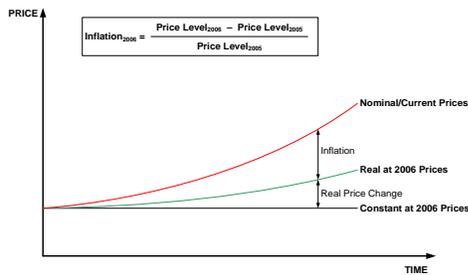
P_I^t = Price level index at time period (t)

P_i^t = nominal price of good or service (i) as of a point in time (t). Index are also denominated as:

$P_I^t = I(t)$ = Price level index at time period (t), price index of a basket of commodities.

2

INFLATION



3

Inflation and Investment Appraisal

3. Changes in Real Prices

Change in real prices; $gP_{iR}^t = (P_{iR}^t - P_{iR}^{t-n}) / P_{iR}^{t-n} * 100$

Where: n = number of periods between the base period (t-n) and the evaluated period (t)

4. Inflation Adjusted Values

$$P_i^{t+1} = P_i^t (1 + gP_{iR}^t)(1 + gP^e)$$

P_i^{t+1} = Estimated nominal price of good (i) in year (t+1)

P_i^t = Nominal price of good (i) in year (t)

gP_{iR}^t = Estimated growth in real price of good (i)

gP^e = Assumed growth in price level index from year (t) to (t+1)

4

Real Exchange Rates, Market Exchange Rates and Inflation

The market exchange rate is the current price of foreign exchange.

The market rate between the domestic currency (D) and the foreign currency (F) can be expressed at any point in time (t) as:

$$E_t^M = (\$/\$F)_t$$

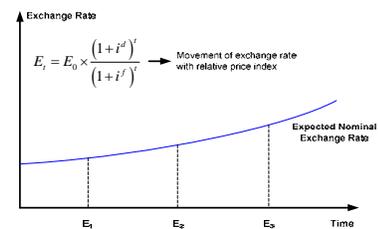
Next Year, if domestic inflation is gp^D , number of domestic currency required to buy a foreign dollar will be $D(1+gp^D)/F$. If the foreign country also has inflation gp^F , this number will be $D(1+gp^D)/F(1+gp^F)$. Thus the exchange rate next year will be

$$E_{t+1}^* = D(1+gp^D)/F(1+gp^F) = E (1+gp^D)/(1+gp^F)$$

For subsequent years, the same formula may be extended.

5

EXPECTED (NOMINAL) EXCH. RATE



i^D : Domestic Inflation (Constant)

i^F : Foreign Inflation (Constant)

E: Exchange Rate

6

How Inflation Affects Analysis

I. Direct Impacts

- On Financing of Investments
- On Real Desired Cash Balances
- On Real Accounts Receivable and Accounts Payable
- On Nominal Interest Expenses Paid if Interest Rate is not Adjustment for Inflation.

II. Tax Impacts

- Interest Expense Deductions
- Depreciation Expenses
- Inventories and Cost of Goods Sold

7

How Inflation Affects Analysis (Cont'd)

(a). Financing of Investment

- Cost escalation due to inflation
Vs.
- Over runs of real expenditures
- Planning for cost escalation due to inflation is normal and should be part of financing plan
- Affects cash flow and also NPV or IRR of the project through Change in A/R, Change in A/P, Change in C/B and indirect impacts.

8

How Inflation Affects Analysis (Cont'd)

(b). Inflation and Desired Cash Balances

Case A:

Assumptions

- Zero Inflation
- Desired Cash = 10% of Annual Sales
- Real Rate of Discount = 5%

Year	1	2	3	3	4
Sales	2000	2000	2000	2000	0
Desired Cash	200	200	200	200	-
Cash Flow Impact	-200	0	0	0	+200

Real PV of holding cash = $-200+200/(1+.05)^4 = -35.46$

9

How Inflation Affects Analysis (Cont'd)

(b). Inflation and Desired Cash Balances

Case B:

Assumptions

- 20% Inflation
- Desired Cash = 10% of Sales

Year	1	2	3	4	5
Price Index	1	1.2	1.44	1.728	2.074
Sales	2000	2400	2880	3456	0
Desired Cash	200	240	288	345.6	0
Cash Flow Impact	-200	-40	-48	-57.6	346
Real Cash Flow	-200	-33	-33	-33	167

PV @ 5% = -153.66

With inflation rate of 20% the cost of cash balance have increased 4.33 times. Cash flow also changes. It will have a negative impact on NPV

10

How Inflation Affects Analysis (Cont'd)

(c). Impact of Inflation on Acts Receivable

Case A:

Assumptions

- Zero Inflation
- Acts Receivable = 1/4 of Sales

Year	1	2	3	4	5
Sales	2000	2000	2000	2000	0
Accounts Rec.	500	500	500	500	0
Change/AR	-500	0	0	0	+500
Receipts	1500	2000	2000	2000	+500

11

How Inflation Affects Analysis (Cont'd)

(c). Impact of Inflation on Acts Receivable

Case B:

Assumptions

- 20% Inflation
- Acts Receivable = 1/4 of Sales

Year	1	2	3	4	5
Price Index	1	1.2	1.44	1.728	2.074
Sales	2000	2400	2880	3456	0
Acts Receivable	500	600	720	864	0
Change/AR	-500	-100	-120	-144	+864
Receipts	1500	2300	2760	3312	864
A. Real Receipts	1500	1917	1917	1917	417
If 20% Inflation	1500	2000	2000	2000	500
B. Real Receipts	1500	2000	2000	2000	500
If Zero Inflation	1500	2000	2000	2000	500
Difference (A-B)	0	-83	-83	-83	-83

The impact in negative on NPV through Changes in A/R

12

How Inflation Affects Analysis (Cont'd)

(c). Impact of Inflation on Acts Payable

Case A:

Assumptions

a. Zero Inflation

b. Acts Receivable = 1/4 of Operating Costs

Year	1	2	3	4	5
Purchases	1000	1000	1000	1000	0
Accounts Pay.	250	250	250	250	0
Change/AR	-250	0	0	0	+250
Expenses	750	1000	1000	1000	250

13

How Inflation Affects Analysis (Cont'd)

(c). Impact of Inflation on Acts Payable

Case B:

Assumptions

a. 20% Inflation

b. Acts Receivable = 1/4 of Sales

Year	1	2	3	4	5
Price Index	1	1.2	1.44	1.728	2.074
Purchases	1000	1200	1440	1728	0
Acts Payable	250	300	360	432	0
Change/AR	-250	-50	-60	-72	+432
Expenditure	750	1150	1380	1656	+432
A. Real Exp.					
If 20% Inflation	750	958	958	958	208
B. Real Exp.					
If Zero Inflation	750	1000	1000	1000	250
Difference (A-B)	0	-42	-42	-42	-42

The impact is positive on NPV through Changes in A/P

14

How Inflation Affects Analysis (Cont'd)

(d). Interest Expense

- Nominal Interest Rate = (i)
- Real Interest Rate = (r)
- Risk Premium = R
- Expected Growth in Prices or Rate of Inflation = gP^e

$$i = r + R + (1 + R + r) gP^e$$

15

Example

By using following information:

$$\text{Inflation rate (} gP^e \text{)} = 20\%$$

$$\text{Risk Premium (R)} = 0$$

$$\text{Real Interest Rate (r)} = 0.05$$

Determination of Nominal Interest Rate

$$i = r + R + (1 + R + r) gP^e$$

$$i = 0.05 + 0 + (1 + 0 + 0.05) * 0.20$$

$$i = 0.26$$

16

Inflation and Its Effect on Interest and Principal Payments

Period	0	1	2	3	4
1. \$1000 Loan @ 5% Interest & No Inflation					
Equilibrium Situation					
Loan	-1000				
Interest		50	50	50	50
Loan Repayment					1000
Cash Flow in Year 0 Prices	-1000	50	50	50	1050
Discounted Cash Flow @ 5%	-1000	47.62	45.35	43.19	863.84
Net Present Value					0
2. \$1000 Loan @ 5% Interest & 10% Inflation					
Dis-Equilibrium Situation					
Loan	-1000				
Interest		50	50	50	50
Loan Repayment					1000
Cash Flow in Current Prices	-1000	50	50	50	1050
Cash Flow in Year 0 Prices	-1000	45.45	41.32	37.57	717.16
Discounted Cash Flow (5%)	-1000	43.29	37.48	32.45	590.01
Net Present Value					-296.77
3. \$1000 Loan @ 15.5% Interest & 10% Inflation					
Equilibrium Situation					
Loan	-1000				
Interest		155	155	155	155
Loan Repayment					1000
Cash Flow in Current Prices	-1000	155	155	155	1155
Cash Flow in Year 0 Prices	-1000	140.91	128.10	116.45	788.88
Discounted Cash Flow (5%)	-1000	134.20	116.19	100.60	649.01
Net Present Value					0

The impact on NPV will be negative if the interest rate is not adjusted for inflation. It will have no impact if the interest rate is adjusted for inflation

17

How Inflation Affects Analysis (Cont'd)

e. Tax Consequences of Interest Expense

Tax shelter of interest expense because it is a deduction from taxable income (5% interest rate, \$1000 loan)

Year	0	1	2	3	4
Interest Expense		50	50	50	50
A: If $t_c = 40\%$, Tax Savings		20	20	20	20
If 10% Inflation, 15.5% Interest, \$1000 Loan					
Year	0	1	2	3	4
Inflation Index	1	1.1	1.21	1.33	1.46
Nominal Interest Expense		155	155	155	155
Real Interest Expense		141	128	116	106
B: If $t_c = 40\%$, Tax Savings		56.36	51.20	46.50	42.32
Increased Tax Shelter (B-A)	36.36	31.20	26.50	22.32	

18

How Inflation Affects Analysis (Cont'd)

f. Inflation, Depreciation Expense and Taxes

Investments of \$1000 in year zero, depreciated over 4 years, depreciation expense is deductible from taxable income

Year	0	1	2	3	4
Depreciation		250	250	250	250
Tax Savings, If $t_c = .40$		100	100	100	100
A: If Zero Inflation, Real Value of Tax Savings		100	100	100	100
Price Index if 10% Inflation	1	1.10	1.21	1.33	1.46
B: If 10% Inflation then Real Value of Savings		90.9	82.6	75.1	68.3
Real Difference in Tax Savings (A-B)		9.1	17.4	24.9	31.7

19

How Inflation Affects Analysis (Cont'd)

g. Inflation, Inventories and Cost of Goods Sold

Two ways of accounting for cost of goods sold
FIFO
LIFO

1. FIFO, If Zero Inflation

Year	0	1	2	3
A: Sales of Outputs	0	300	300	300
B: Purchases of Input	100	100	100	0
C: COGS		100	100	100
D. Measured Profits (A-C)		200	200	200
E. Taxes Paid if $t_c = .4$		80	80	80
If 20% Inflation, Price Index		1.2	1.44	1.728
a. Sales	0	360	432	518.4
b. Purchases of Inputs	100	120	144	0
c. COGS		100	120	144
d. Measured Profits		260	312	374.4
e. Nominal Taxes Paid If $t_c = .4$		104	124.8	149.76
f. If Real Taxes Paid		86.67	86.67	86.67
Difference (F-E)		6.67	6.67	6.67

20

How Inflation Affects Analysis (Cont'd)

g. Inflation, Inventories and Cost of Goods Sold

2. LIFO, If Zero Inflation

Year	0	1	2	3
A: Sales of Outputs	0	300	300	300
B: Purchases of Input	100	100	100	0
C: COGS		100	100	100
D. Measured Profits (A-C)		200	200	200
E. Taxes Paid if $t_c = .4$		80	80	80
If 20% Inflation, Price Index		1.2	1.44	1.728
a. Sales	0	360	432	518.4
b. Purchases of Inputs	100	120	144	0
c. COGS		120	144	100
d. Measured Profits		240	288	418.4
e. Nominal Taxes Paid If $t_c = .4$		96	115.2	167.36
f. If Real Taxes Paid		80	80	96.85
Difference (F-E)		0	0	16.85

21

Steps for Inflation Adjustment of Analysis (1)

1. Estimate Real Prices (P^i_t / P_t level) and rate of change in real prices
2. Make Assumptions About Future Inflation Rate
3. Determine Changes in Inflation Adjusted (estimated nominal) Prices
4. Determine Nominal Interest Rate
5. Determine Cash Requirements (Nominal)
6. Determine Financing Requirements (Nominal)

22

Steps for Inflation Adjustment of Analysis (2)

7. Estimate Taxable Income and Income Taxes (Nominal)
8. Construct Pro-Forma Cash Flow Statement in Nominal Values
9. Calculate Nominal Net Cash Flows From Different Points of View
10. Deflate Nominal Values by General Price Index for Each Year to Obtain Real Cash Flow Statements
11. Calculate Debt Service Capacity Ratios for Total Investment (Banker's) Point of View
12. Calculate NPV and IRR for Owner's Point of View

23

SCALE AND TIMING

Dr. D.N.S. Dhakal
Senior Fellow
Sanford School of Public Policy, Duke University

Azerbaijan State Economics University (ASEU)
Spring 2010

0 0

The Importance of Scale and Timing in Project Appraisal

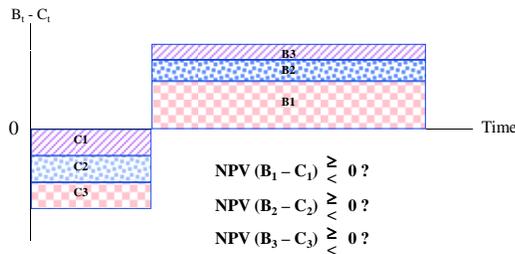
- Why is scale important?
- Too large or too small can destroy a good project

1

Choice of Scale

Rule: Optimal scale is when NPV = 0 for the last addition to scale and NPV > 0 for the whole project

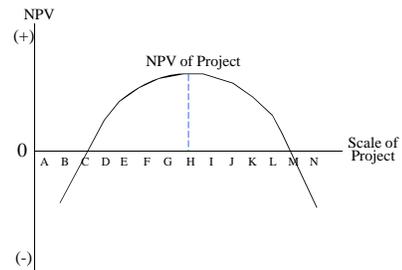
- Net benefit profiles for alternative scales of a facility



2

Determination of Scale of Project

- Relationship between net present value and scale



3

SALIENT FEATURES OF BUDI-GANGA HYDROELECTRIC PROJECT

- CONSTRUCTION PERIOD **3 YRS**
- PROJECT EVALUATION PERIOD **35 YRS**
- ECONOMIC LIFE **50 YRS**
- INSTALLED CAPACITY **?**
- DESIGN DISCHARGE **27.5 cum sec**
- HEIGHT OF WEIR **25 M**

4

Budiganga Hydroelectric Project Possible Capacities

Capacity MW	Capital Cost USD Million	Storage Million CM	Firm Pick Energ Million Kw	Off Peak Million Kwh	Secondary Energy Kwh	Average Million kwh
10	38.06	0.083	21	37	11	68
15	45.36	0.19	30	36	18	85
20	50.09	0.239	37	41	25	103
25	59.13	0.286	43	40	36	119
30	70.42	0.365	48	39	43	131
35	77.4	0.405	53	38	50	141

5

REVENUE AND COSTS

TARIFF STRUCTURE

Peak firm energy	0.0854	\$/kwh
Off peak firm energy	0.0635	\$/kwh
Secondary energy	0.0460	\$/kwh
Capacity benefit	0.0108	\$/kwh

Annual cost of O and M 1.50% of total cost

6

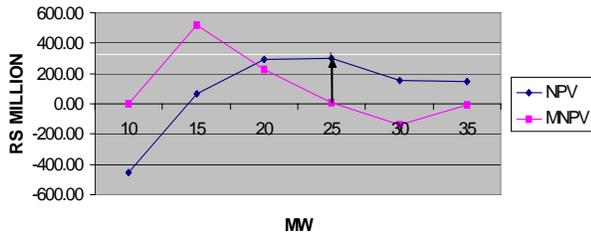
SCALE ANALYSIS

	NPV	IRR
NCF for 10 MW capacity	-450.87	4.81%
NCF for 15 MW capacity	65.80	10.97%
NCF for 20 MW capacity	289.34	14.08%
NCF for 25 MW capacity	299.21	13.55%
NCF for 30 MW capacity	156.76	11.51%
NCF for 35 MW capacity	147.35	11.28%

	MNPV	MIRR
NCF for 10 MW capacity		
NCF for 15 MW capacity	516.669	230.03%
NCF for 20 MW capacity	223.544	49.07%
NCF for 25 MW capacity	9.866	10.73%
NCF for 30 MW capacity	-142.446	2.71%
NCF for 35 MW capacity	-9.404	9.13%

7

SCALE ANALYSIS USING NPV AND MNPV



8

CONCLUSION

THE OPTIMUM SCALE OF THE PROJECT IS 25 MW.

9

Timing of Investments

Key Questions:

1. What is right time to start a project?
2. What is right time to end a project?

Four Illustrative Cases of Project Timing

Case 1. Benefits (net of operating costs) increasing continuously with calendar time. Investments costs are independent of calendar time

Case 2. Benefits (net of operating costs) increasing with calendar time. Investment costs function of calendar time

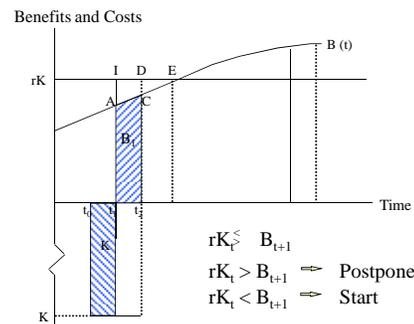
Case 3. Benefits (net of operating costs) rise and fall with calendar time. Investment costs are independent of calendar time

Case 4. Costs and benefits do not change systematically with calendar time

10

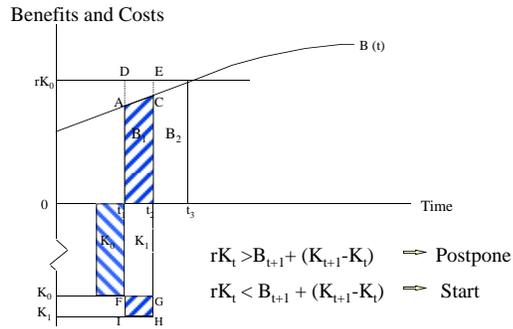
Case 1: Timing of Projects:

When Potential Benefits Are a Continuously Rising Function of Calendar Time but Are Independent of Time of Starting Project



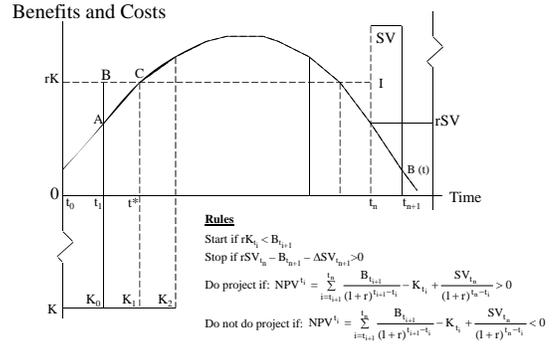
11

**Case 2: Timing of Projects:
When Both Potential Benefits and Investments Are
A Function of Calendar Time**



12

**Case 3: Timing of Projects:
When Potential Benefits Rise and Decline
According to Calendar Time**



13

The Decision Rule

If $(rSV_t - B_t - \Delta SV_t) > 0 \Rightarrow$ Stop

$< 0 \Rightarrow$ Continue

$\Delta SV_t = SV_t - SV_{t-1}$

This rule has 5 special cases:

1. $SV > 0$ and $\Delta SV < 0$, e.g. Machinery
2. $SV > 0$ but $\Delta SV > 0$, e.g. Land
3. $SV < 0$, but $\Delta SV = 0$, e.g. A nuclear plant
4. $SV < 0$, but $\Delta SV > 0$, e.g. Severance pay for workers
5. $SV < 0$ and $\Delta SV < 0$ e.g. Clean-up costs

14

RISK ANALYSIS AND RISK MANAGEMENT

Prof. Roy Kelly
Sanford School of Public Policy, Duke University
(roykelly@duke.edu)

Azerbaijan State Economics University (ASEU)
Spring 2010

1

What is risk?

- Risk generally describes the possible deviation from a projected outcome.
- To project any uncertain outcome into the future you need to have a “predictive model”.
- A predictive model could be a simple formula or a very complex worksheet.

2

Decision-Making Under Uncertainty

1. Risk analysis

- How to identify, analyze, and interpret the expected variability in project outcomes

2. Risk Diversification and management

- How to diversify unsystematic risk
- How to redesign and reorganize projects in order to reallocate risk

Risk Analysis

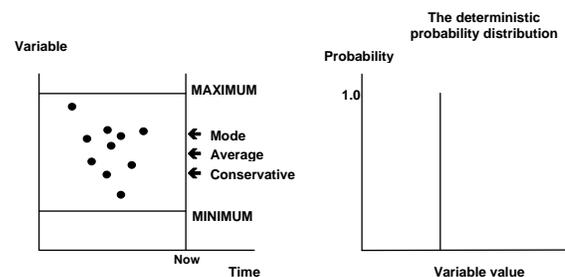
1. WHY?

- Project returns are spread over time
- Each variable affecting NPV is subject to a high level of uncertainty
- Information and data needed for more accurate forecasts are costly to acquire
- Need to reduce the likelihood of undertaking a "bad" project while not failing to accept a "good" project

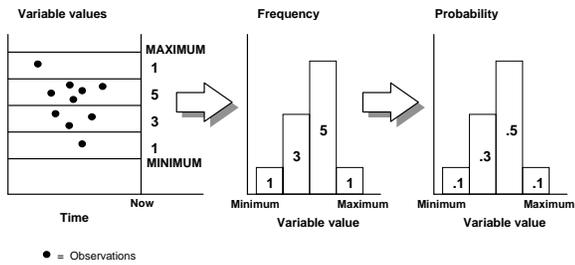
Inputs are projected as certainties (Base Case Scenario)

- When we provide inputs to a predictive model we use one particular probability distribution – the Deterministic Probability Distribution.
- By that we assign 100% probability that the single value of the input we use in the projection will actually arise.

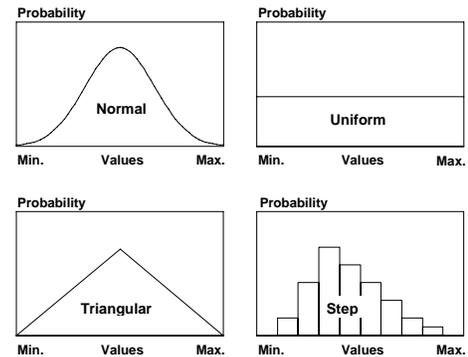
Forecasting the outcome of a future event: Single-value estimate



From a frequency to a probability distribution



Multi-value probability distributions



Multi-value probability distributions as their inputs to a predictive model.

- Any possible deviation in any of the critical input variables of a predictive model from their base case values will generate a new scenario with a different outcome (or outcomes).
- There are potentially an infinite number of combinations of input values possible, each causing a different set of results.

2. Alternative Methods of Dealing With Risk

- 2.1 Sensitivity Analysis
- 2.2 Scenario Analysis
- 2.3 Monte Carlo Risk Analysis (or Simulation Analysis)

2.1 Sensitivity Analysis

- Test the sensitivity of a project's outcome (NPV or the key variable) to changes in value of one parameter at a time
- "What if" analysis
- Allows you to test which variables are important as a source of risk
- A variable is important depending on:
 - A) Its share of total benefits or costs
 - B) Likely range of values
- Sensitivity analysis allows you to determine the direction of change in the NPV
- Break-even analysis allows you to determine how much a variable must change before the NPV or these key variable moves into its critical range turns negative

2.2 Scenario Analysis

- Scenario analysis recognizes that certain variables are interrelated. Thus a small number of variables can be altered in a consistent manner at the same time.
- **What is the set of circumstances that are likely to combine to produce different "cases" or "scenarios"?**
 - A. Worst case / Pessimistic case
 - B. Expected case / Best estimate case
 - C. Best case / Optimistic case

Note: Scenario analysis does not take into account the Probability of cases arising
- **Interpretation is easy when results are robust:**
 - A. Accept project if NPV > 0 even in the worst case
 - B. Reject project if NPV < 0 even in the best case
 - C. If NPV is positive in some cases and negative in other cases, then results are not conclusive
- **Difficult to define what scenario's to specify without first examining the range of possible outcomes by a Monte Carlo Analysis.**
- **Scenario analysis is a good way to communicate the results of a Monte Carlo analysis.**

2.3 Monte Carlo Method of Risk Analysis

- A natural extension of sensitivity and scenario analysis
- Simultaneously takes into account different probability distributions and different ranges of possible values for key project variables
- Allows for correlation (covariation) between variables
- Generates a probability distribution of project outcomes (NPV) instead of just a single value estimate
- The probability distribution of project outcomes may assist decision-makers in making choices, but there can be problems of interpretation and use.

Monte-Carlo Simulation

- Monte Carlo simulation is a methodology that handles the complexity arising from projecting multi-value probability distributions as inputs to a model.
- Practically this is only possible to be applied with the use of a computer and specialised software.

RISK MANAGEMENT

- **Costs of risk:** Reduction in the value of asset or cash flow because of actual or perceived variability in value.
- **Risk analysis:** Analysis of sources and size of risk in a project on the net cash flow of project - Monte Carlo analysis.
- **Risk management:** Ways to restructure internal and external relationships of projects to reduce costs of risk and improve incentives through contracts and other arrangements to share and reallocate risks.

Sources of risk

- **External or exogenous**
 - Markets: prices and quantities of products, material and service inputs in future may vary in a way different from projected values
 - Financial and foreign exchange markets
 - Government policy – taxes, licensing, regulation
 - Natural disasters, politics, personal/physical security
- **Internal or endogenous**
 - Relationships between prices and quantities within project to exogenously determined market values. Is product price correlated with input price?
 - Real choices or options in project design – degree of flexibility to expand or to change product lines, markets, raw materials, etc in response to market situations
 - Contractual relationships involving owners, debt holders, labor, suppliers and/or government

How to Reduce Costs of Risk

- 1. Contracting: reallocating or sharing risks to reduce cost of risk**
 - Contracts that change internal relationships to deal with exogenous market variability
 - Contracts to limit exogenous market variability in price and/or quantities of product or raw materials
 - Internal relationships to change endogenous incentives
 - Profit sharing, stock options and other flexible wage agreements
 - Profit participation by construction contractor and/or operator
- 2. Real options: design flexibility into project to allow for responses to new situations or market changes**
- 3. Project finance: contractual arrangements to deal with risk in large investments involving several lenders and equity holders**

Risk spreading or pooling

- The most fundamental mechanism for reducing (even eliminating risk) is risk spreading or pooling.
- As long as the variation in a particular return is “**unsystematic**” or **independent or unrelated** to all other returns, then the variation can be reduced in the line with the number of persons sharing the return. By spreading a risk across a pool of persons (each owning a small share of the risk), the variability can be reduced to zero if the pool is large enough.

Risk insurance

- Insurance markets generally reduce risk by establishing risk pools with a large number of policy holders insuring against a specific risk. For large risks, reinsurance pools are available internationally to assist national insurance companies.
- Projects can take out insurance policies against risks of losses from fire, theft, accidents, political events, crop loss, etc
- Some risks too large for the market – hurricane flood insurance so that government guarantees required

Contracts: shifting and sharing risks

- Special contractual arrangements are often required to mitigate risks to make projects viable
- Efficient contracts may provide:
 - better risk shifting - better distribution of cost across circumstances
 - Given probabilities, change the allocation of risk between participants given different preferences and capacities to bear risk
- Better incentives
 - higher project returns or lower total project risk as result of incentives
 - Change the incentive structure to change the probabilities of outcomes: parties have incentives to increase probability of success and reduce probability of failure of project

Risk Shifting Contracts

Shift part of risk to purchaser of output or supplier of raw material:

Contracts that limit the range of values of a particular cash flow item by **limiting variability of price or quantity or value.**

For example, a purchaser may agree to **purchase a minimum quantity** or to **pay a minimum price** in order to be sure of delivery (“**take and pay**”) or **pay a minimum amount** even if no demand (“**take or pay**”).

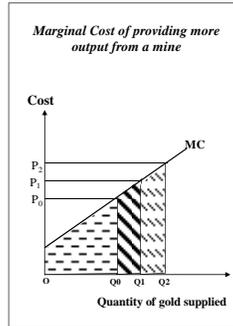
These measures would put a lower bound on the sales revenue.

such measures would include:

1. A limited product price range: price ceilings/floors
2. A fixed price growth path or pay a long-run average price
3. Specific price escalator clauses that would maintain the competitiveness of the product, e.g. indexing price to the price of a close substitute or cost of major input

Second Postulate

- The competitive supply price of each incremental unit of a good measures the economic cost of the resources (inputs) that goes into the production of that unit.
- The supply (marginal cost) curve represents the minimum prices that suppliers are willing to accept for successive units of a good or service that they supply.



Third Postulate

- Costs and benefits are added up to derive the net benefits of project.
- This methodology measures the net economic benefit of the project by subtracting the total resource costs used to produce the project's output from the total benefits of the output.
- This approach separates the social aspects of project appraisal from the economic efficiency aspects.

Summary: Three Basic Postulates for Applied Welfare Economics

A. The competitive demand price for a given unit of an item measures the value of that unit to the demander

Willingness to pay

B. The competitive supply price for a given unit of a good or service measures the value of that unit to the supplier

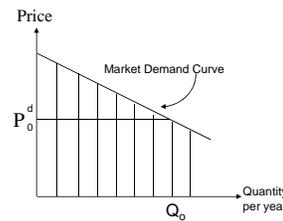
Opportunity cost (or supply price)

C. Costs and benefits accruing to different groups should be added up to determine overall economic benefits; i.e. A dollar is a dollar no matter to whom it accrues

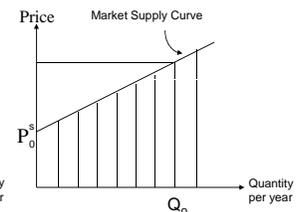
9

Illustration of Basic Postulates

Postulate A:
Willingness to Pay

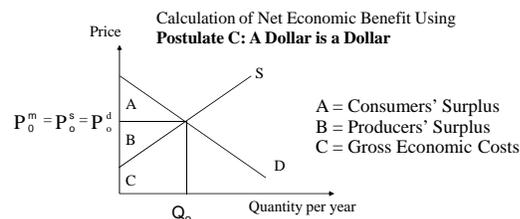


Postulate B:
Opportunity Cost



10

Illustration of Basic Postulates and Cost/Benefit Accounting Framework



Net Economic Benefit	=	Total Economic Benefit	-	Total Economic Cost
	=	(A + B + C)	-	(C)
Net Economic Benefit (A + B)	=	Consumers' Surplus (A)	+	Producers' Surplus (B)
Consumers' Surplus A	=	Total Economic Benefits (A + B + C)	-	Total Revenues (B + C)
Producers' Surplus B	=	Total Fin. Revenues (B + C)	-	Total Economic Cost (C)

Estimation of Economic Prices

- In order to estimate the true economic value of a good or service, one needs to know:

Tradable, or Non-Tradable

- Is the good non-tradable (domestic)?
- Is the good internationally tradable?
- The difference is whether the price of the good is determined by the forces of demand and supply in the domestic market or given to the country by international markets?

Examples of Tradeables and Non-Tradeables

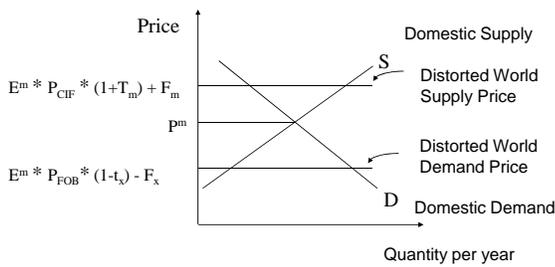
- Categorize the following items:
 - Machinery and equipment
 - Construction materials: bricks, sand and gravel, cement
 - Perishable items: fruits & vegetables, ice cream, drinking water
 - Land and buildings
 - Chemicals, textiles, electronic goods, cars and trucks
 - Coal, petroleum
 - Electricity, irrigation water
 - Services like haircut, road and rail transportation, financial services (banking and insurance)

Non-Tradable Commodities

- A good or service is considered non-tradable when its domestic price is determined by local demand and supply.
- An increase in demand (or supply) by a project could affect the amounts demanded by domestic consumers or produced by other suppliers.

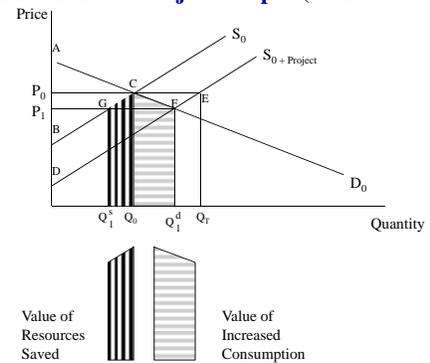
14

Non - Tradable Good



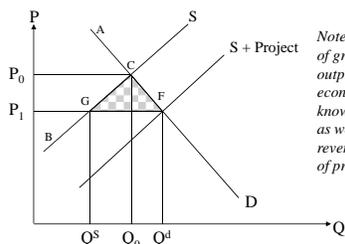
15

Non-Traded Goods Economic Benefits of Project Output (No Distortions)



16

Financial, Economic and Distributive Effects of Project to Supply Non-Traded Goods with no Distortions



Note this is only an analysis of gross and net value in output market. To find net economic benefit, need to know economic cost of project as well. Here, only financial revenues and external benefits of project are given.

Financial Value of Output = $Q^d G F Q^d$ or $P_1 (Q^d - Q^s)$
 Economic Value of Output = $Q^d G C F Q^d$ or $(P_0 + P_1) / 2 * (Q^d - Q^s)$
 Difference (Economic - Financial) = $G C F$ or $(P_0 - P_1) / 2 * (Q^d - Q^s)$
 $G C F = P_1 P_0 C F - P_1 P_0 C G$
 = Gain in Consumer Surplus - Loss in Producer Surplus
 Economic Value = Financial Value + Gain in Consumer Surplus - Loss in Producer Surplus
 = Financial Value + Distributive Impacts

Calculating the Economic Value of Non-Traded Goods

$$\text{Economic Value} = W^s P^s + W^d P^d$$

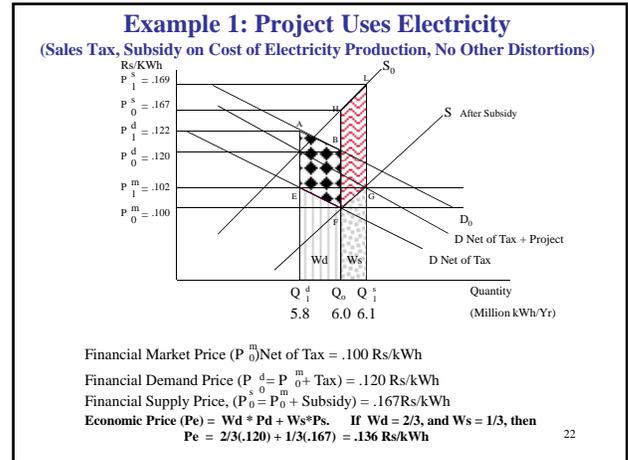
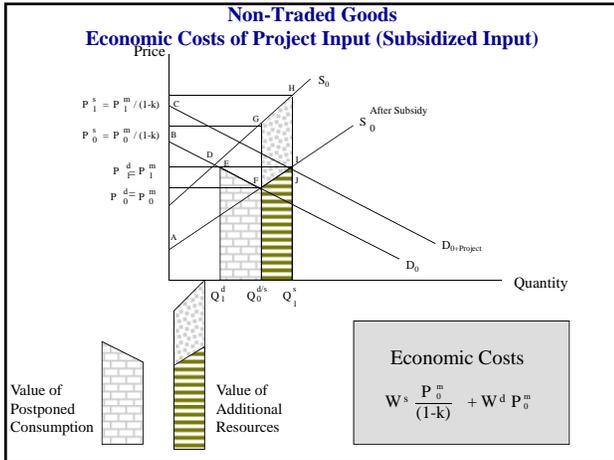
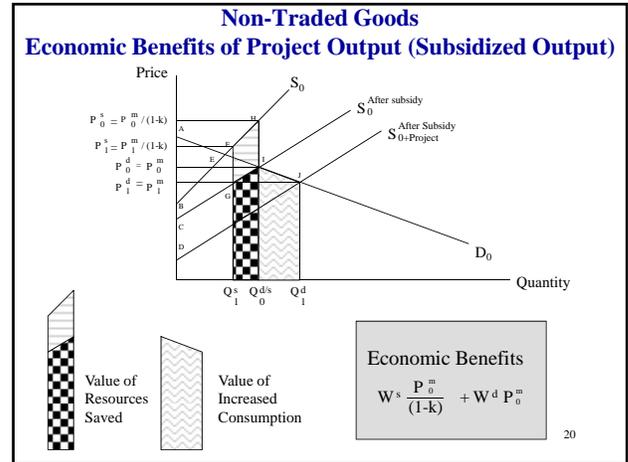
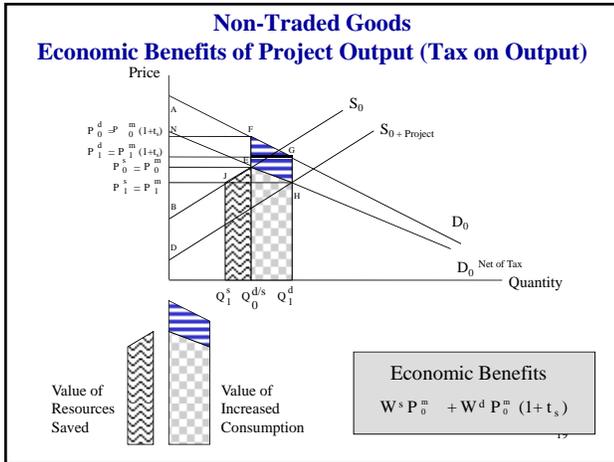
= weighted average of supply (P^s) and demand (P^d) price

$$\text{Where: } W^s = \frac{\text{Supply Elasticity}}{\text{Supply Elasticity} + \text{Demand Elasticity}} = \frac{\epsilon}{\epsilon - \eta}$$

$$W^d = \frac{\text{Demand Elasticity}}{\text{Supply Elasticity} + \text{Demand Elasticity}} = \frac{-\eta}{\epsilon - \eta}$$

P^s = Supply Price ϵ = own price elasticity of supply
 P^d = Demand Price η = own price elasticity of demand

Notes: 1. Economic price is equal to undistorted market price
 2. In case of traded goods the entire weight is on supply because demand does not change.



Conversion factors

- A conversion factor (CF) is the ratio of the economic price to the financial price (the price paid or received by the project and contained in the financial analysis)
- CF = economic price/financial price**
- Conversion factors are a useful device for converting financial cash flows to economic values.
- Economic benefit or cost = CF*financial cash flow

ECONOMIC COSTS OF TRADED GOODS

Brij Kishore
Senior Fellow
Sanford School of Public Policy, Duke University

Azerbaijan State Economics University (ASEU)
Spring 2010

Classification of a Project's Commodity Inputs and Outputs

Tradable Commodities

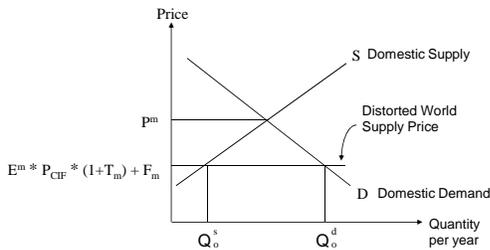
A good or services is considered tradable when an increase in demand (or supply) by a project does not affect the amount demanded by domestic consumers

- An increase in demand for an **IMPORTABLE** commodity results in an increase in demand for imports
- An increase in demand for an **EXPORTABLE** commodity results in a reduction in exports
- When a project produces a tradable commodity, there will be either a reduction in imports or an increase in exports.

An **Importable** commodity includes imported goods and domestically produced goods that are close substitutes for imported goods

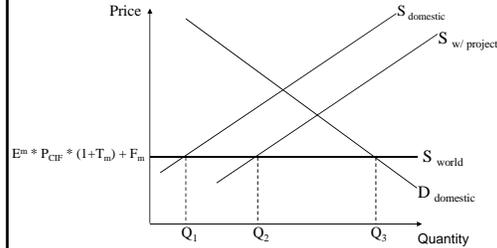
An **Exportable** commodity includes exported goods and close substitutes for exported goods

Importable Good



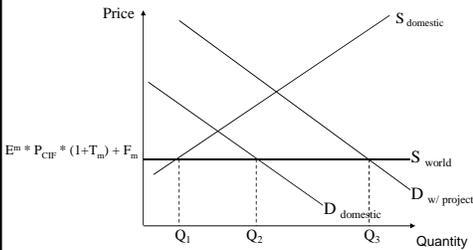
Imports = $Q_o^d - Q_o^s$
 E^m = Market Exchange Rate
 T_m = Rate of Import Tariff
 F_m = Domestic Freight to Market

Project Supplies More of an Importable Good



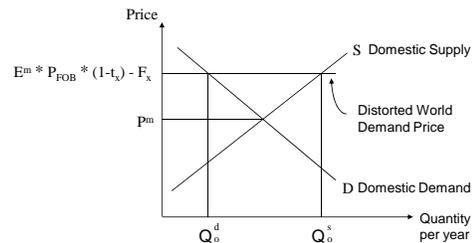
Project reduces quantity imported. No change in domestic consumption.

Project Demands More of an Importable Good



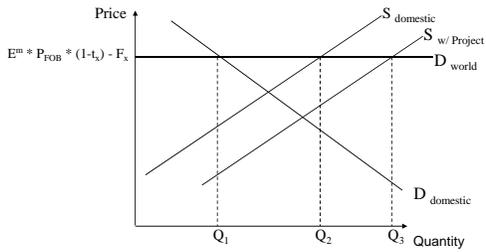
Project requirements will be met by additional imports (world supply). Domestic consumption is not affected.

Exportable Good



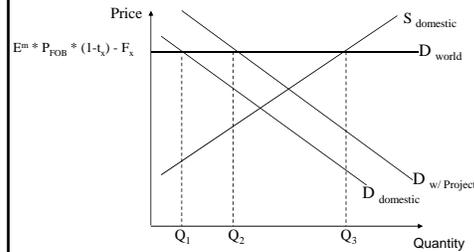
Exports = $Q_o^s - Q_o^d$
 E^m = Market Exchange Rate
 t_x = Export Tax
 F_x = Freight and Trading Costs to Port

Project Supplies More of an Exportable Good



Project increases exports. Domestic consumption remains unchanged.

Project Demands More of an Exportable Good



Project requirements will reduce quantity exported. Consumption of previous consumers remains unchanged.

Estimating Economic Prices of Tradable Goods (1)

1. Adjust for commodity - specific trade distortions

- Adjust financial prices for commodity-specific distortions and costs that drive a wedge between their international prices and their domestic market prices
- Why? Trade taxes and subsidies are transfers between consumers, producers, and the government and are not part of the real resources consumed or produced by a project.

9

Estimating Economic Prices of Tradable Goods (2)

2. Value the foreign exchange at the economic (shadow) exchange rate (E^e)

- Multiply the CIF and FOB prices at the border by the economic price of foreign exchange (E^e)
- Alternatively, add a foreign exchange premium $[(E^e/E^m) - 1]$, or $[(E^e/OER) - 1]$, per unit of foreign exchange demanded (or supplied) by a project.

10

Estimating Economic Prices of Tradable Goods (3)

3. Adjust for handling and transportation costs

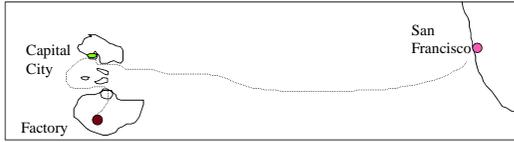
- Include the economic costs of handling and transportation that are necessary to move trade commodities to or from the point of entry
- In the case of imported commodities, these costs should be added to the CIF price.
- In the case of exported commodities, these costs should be subtracted from the FOB price.

11

Tradables produced or used by project (Four Cases)

	Project produces Goods as Output	Project used Goods as Input
Exportable	Exports Increase	Exports Decrease (Export Displacement)
Importable	Imports Decrease (Import Substitution)	Imports Increase

Figure 1: Project Supplies an Importable Good



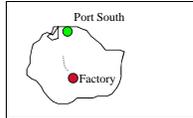
- SF World Price
- + Transport and Insurance (SF to Capital City)
- CIF Cap. City**
- + Tariff
- + Port Charges
- + VAT
- Importer's Price**
- Transport incl. VAT (Cap City to Factory)
- Factory Gate Price, Gross of Tax
- VAT Tax
- Factory Gate Price, Net of Tax

13

Project Supplies an Importable Good
Example of calculation of Conversion Factor

San Francisco World Price (US\$/Metric Ton)	Financial Price						
S.F. - Cap. City Transport	\$ 737.00						
Transport Insurance	\$ 100.00						
	\$ 4.60						
CIF Cap. City	\$ 841.60						
	Rs 33,664.00						
	Financial Price (Rs) [A]	Unadjusted Conversion Factor [B]	Unadjusted Economic Value [C=A*B]	Foreign Exchange Content [D]	FOREX Premium (Adjusted) [E=A*D*12]	Economic Value (Adjusted) [F=C+E]	
CIF Cap. City (Rs/Ton)	33,664.00	1	33,664.00	100%	4,039.68	37,703.68	
Plus:							
Tariff @ 20%	6,732.80	0	0.00				
VAT @ 10%	4,039.68	0	0.00				
Handling and Port Charges	694.32	0.8	555.46	100%	83.32	638.77	
VAT @ 10%	69.43	0	0.00				
Net Importer Price	45,200.23						38,342.45
VAT	4,520.02	0	0.00				
Importer's Price (Market Price)	49,720.25						38,342.45
Less:							
Handling and Transport, Factory to Cap	2,600.00	1	2,600.00	100%	312.00	2,912.00	
VAT @ 10%	260.00	0	0.00				
Factory Gate Price, Net of VAT	46,860.25						35,430.45
Conversion Factor = EV/FV =	0.75608756						

Figure 2: Project Uses an Importable Good



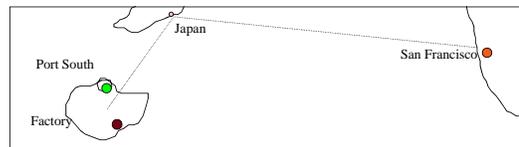
- CIF Port South
- + Tariff
- + Transport, Port Charge (Port to Factory Gate)
- Factory Gate Price

Table 2:

Project Uses an Importable Good (Packaging Material)							
	Financial Price (Rs) [A]	Unadjusted Conversion Factor [B]	Unadjusted Economic Value [C=A*B]	Foreign Exchange Content [D]	FOREX Premium [E=A*D*246]	Economic Value (Adjusted) [F=C+E]	
1							
2	CIF Port South (Rs/Metric Ton)	925	1.00	925	100%	228	1153
3	Plus:						
4	Tariff @ 30%	277.5	0	0		0	
5	Port Charges and Transport, Port South to Factory	12	1.00	12	30%	90	12.90
6	Factory Gate Price	1214.5					1166
7	Conversion Factor = EV/FV =	.96					

15

Figure 3: Project Produces an Exportable Good



- SF World Price
- + Transport and Insurance (SF to Japan)
- CIF Japan
- Transport and Ins. (Port South to Japan)
- FOB Port South
- Transport, Port Charge (Factory to Port South)
- Factory Gate Price

16

Table 3: Project Supplies an Exportable Good (Tomato Paste)

	Financial Price						
1	San Francisco World Price (US\$/Metric Ton)	US\$ 737.00					
2	S.F. - Japan Transport	US\$ 135.00					
3	Transport Insurance	US\$ 4.60					
4	CIF Japan	US\$ 876.6					
5	Less:						
6	Transport Port South to Japan	US\$ 34.00					
7	Transport Insurance	US\$ 4.60					
8	FOB Port South	US\$ 838.00 or Rs 23,045.00					
9		Financial Price (Rs) [A]	Unadjusted Conversion Factor [B]	Unadjusted Economic Value [C=A*B]	Foreign Exchange Content [D]	FOREX Premium [E=A*D*246]	Economic Value (Adjusted) [F=C+E]
10	FOB Port South (Rs/Metric Ton)	23,045.00	1.0	23,045	100%	5,669.07	28,714.07
11	Less:						
12	Port Charges and Transport, Factory to Port South	262.73	1.0	262.73	30%	19.39	282.12
13	VAT*	26.27					
14	Factory Gate Price	22,782.27					28,431.95
15	Conversion Factor = EV/FV =	1.247986					

*VAT imposed on purchases of inputs of exported goods is refunded, exports are usually zero rated for VAT.

17

- FOB Capital City
- Port Handling
- Cap. City Exporter's Price
- + Transport Market
- + Dealer's Margin
- + Transport Market to Project (Farm)
- Factory Gate Price

Table 5: Project Uses an Exportable Good (Paddy Seed)

	Financial Price (Rs) [A]	Unadjusted Conversion Factor [B]	Unadjusted Economic Value [C=A*B]	Percent Tradable [D]	FOREX Premium (24.6%) [E=A*D*246]	Economic Value (Adjusted) [F=C+E]
1	FOB Cap. City (Rs per Ton)	6,326	1.00	6,326	100%	7,882
2	Less: Port Handling	155	.78	121	0%	121
3	Cap. City Exporter's Price	6,171				7,761
4	Plus:					
5	Transport Cap. City to Loc. Market	515	1.00	515	10%	528
6	Dealer's Margin	235	.68	160	0%	160
7	Price at Local Market	6,921				8,449
8	Transport Market to Project (Farm)	120	1.00	120	17%	125
9	Factory (Farm) Gate Price	7,041				8,574
10	Conversion Factor = EV/FV =	1.22				

18

SUMMARY

Economic Value of Importable Good Production =

CIF (adj. For Economic Exchange Rate) + Economic Cost of Local Freight from Port to Market - Economic Cost of Local Freight from Project to Market

Economic Cost of Imported Input =

CIF (adj. For Economic Exchange Rate) + Economic Cost of Freight from Port to Project

Economic Cost of Exportable Input =

FOB (adj. For Economic Exchange Rate) + Economic Cost of Local Freight from Export Producer to Project - Economic Cost of Local Freight from Export Producer to Port

Economic Value of Exportable Production =

FOB (adj. For Economic Exchange Rate) - Economic Cost of Local Freight from Project to Port

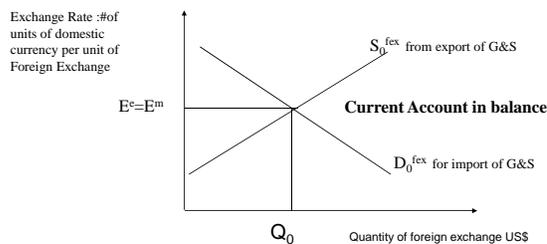
NATIONAL PARAMETERS: FOREIGN EXCHANGE AND COST OF CAPITAL & DISTRIBUTIONAL ANALYSIS

Brij Kishore
Senior Fellow
Sanford School of Public Policy, Duke University

Azerbaijan State Economics University (ASEU)
Spring 2010

1

Determination of Market Exchange Rate: No distortions and Current Account in Balance



E^m = Market Exchange Rate

E^c = Economic Exchange Rate

2

Major distortions affecting Forex Market

- **TRADE DISTORTIONS**
 - Import duties, export taxes/subsidies
 - Import duties reduce demand for imports and hence demand for forex and hence E^m appreciates; export subsidies have same impact on forex markets
 - Export taxes reduce exports causing E^m to depreciate
- **INDIRECT TAXES ON DOMESTIC CONSUMPTION or PRODUCTION**
 - VAT, General Sales Tax (GST) and Excises or selective indirect taxes on consumption reduce demand for importables (decreasing imports) and exportables (increasing exports) causing E^m to appreciate.

3

Foreign Exchange Premium

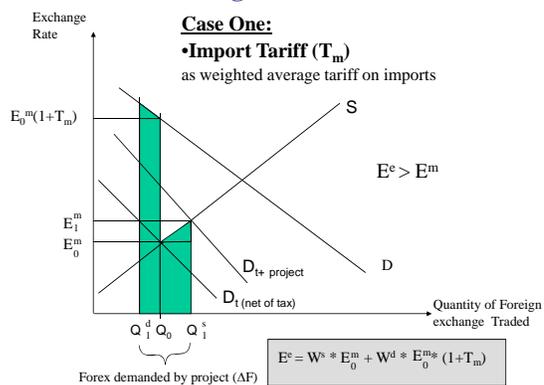
- In most countries, market distortions tend to strengthen the market exchange rate (expressed in domestic currency per unit of foreign exchange or D\$/F\$ the market exchange rate is lower) such that the economic price of foreign exchange (E^c) exceeds the market exchange rate (E^m).
- Foreign exchange premium, $FEP = E^c/E^m - 1$
- Economic price of foreign exchange E^c is estimated using the same framework as that for non-traded goods.

Estimating Forex Premium

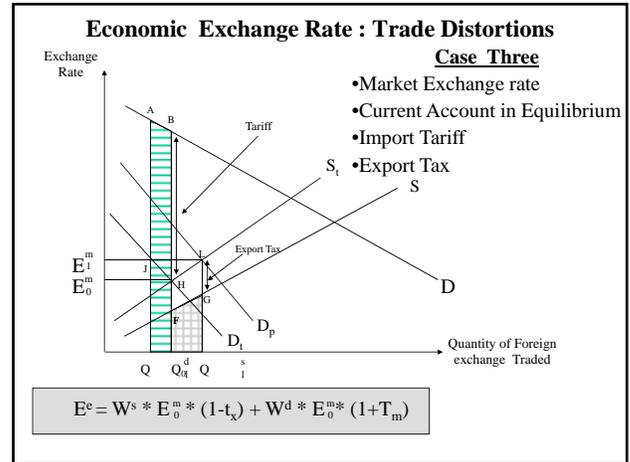
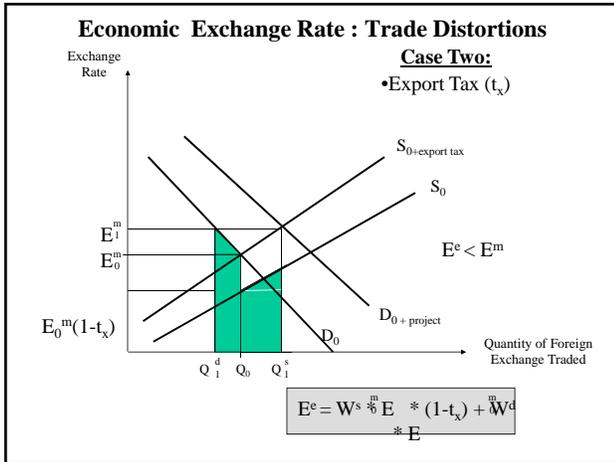
- In most countries, major indirect taxes are
 - Import duties
 - VAT or GST on consumption
 - Excise or selective taxes on consumption
- Generally expect $E^c/E^m > 1$
- When project demands (supplies) extra foreign exchange (ΔF), exchange rate (E^m) will rise causing:
 - Demand for imports to decrease (demand for importables decreases; supply of importables increases)
 - Supply of exports to increase (demand for exportables decreases; supply of exportables increases)
 - Resources to shift from non-traded goods markets to allow increased supply of importables and exportables which causes non-traded goods price to rise causing decline in demand

5

Economic Exchange Rate: Trade Distortions



6

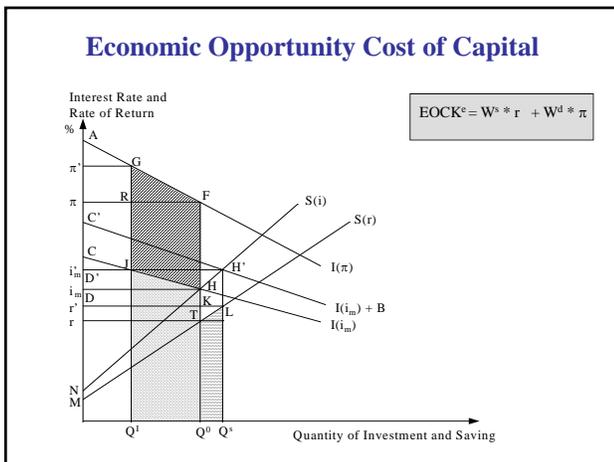
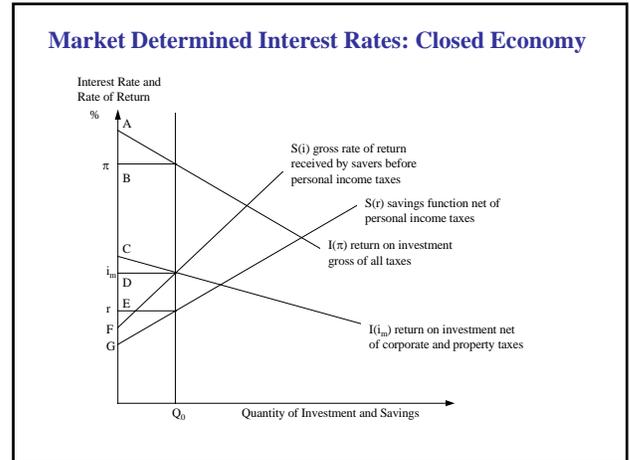


Economic Opportunity Cost of Capital

(Closed Capital Market)

Sources of Capital:

- Increased domestic private savings: With the project demanding additional capital, the cost (interest rate) goes up and there is increased supply of savings. The cost (marginal) of this private savings is the net of tax return on savings.
- Displaced demand in different sectors: With higher interest rate, other investors forego their investment and that capital moves to the project. The cost (marginal) of this foregone return is the gross of tax return including the risk premium.



EOCK: Open Capital Market

- Sources of capital:
 - Displaced demand in different sectors
 - Increased domestic private savings
 - Increased foreign savings
- Marginal economic costs of sources of capital
 - Gross of tax and risk rate of return
 - Net of tax return on savings
 - Net of tax cost of incremental foreign investments

DISTRIBUTIONAL/STAKEHOLDER IMPACTS

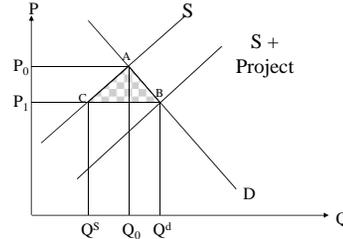
FOR ALL INPUT AND OUTPUT VARIABLES:

$$\text{Economic Value} = \text{Financial Value} + \text{Stakeholder Impacts}$$

- Thus, Stakeholder Impacts is the difference between financial and economic values. These are often called externalities generated by the project.
- This is demonstrated using three examples
 - Example 1: Non-traded good without distortion
 - Example 2: Non-traded good with a sales tax
 - Example 3: Traded good with an import tariff

13

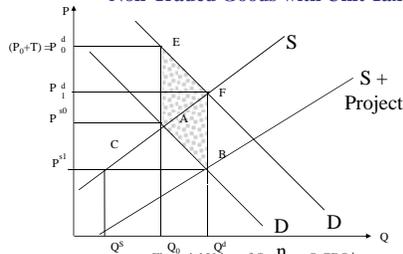
Financial, Economic and Distributive Effects of Project to Supply Non-Traded Goods with no Distortions



$$\begin{aligned} \text{Financial Value of Output} &= Q^d C B Q^d \text{ or } P_1 (Q^d - Q^s) \\ \text{Economic Value of Output} &= Q^d C A B Q^d \\ \text{Difference (Economic - Financial)} &= C A B \\ C A B &= P_1 P_0 A B - P_1 P_0 A C \\ &= \text{Gain in Consumer Surplus} - \text{Loss in Producer Surplus} \\ \text{Economic Value} &= \text{Financial Value} + \text{Gain in Consumer Surplus} - \text{Loss in Producer Surplus} \\ &= \text{Financial Value} + \text{Distributive Impacts} \end{aligned}$$

14

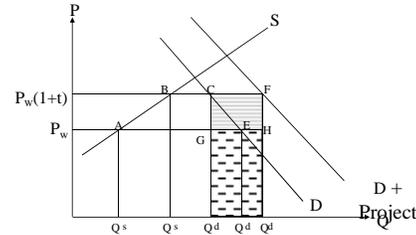
Financial, Economic and Distributive Effects of Project to Supply Non-Traded Goods with Unit Tax



$$\begin{aligned} \text{Financial Value of Output} &= Q^d C B Q^d \\ \text{Economic Value of Output} &= Q^d C A Q_0 + Q_0 A B Q^d + A E F B \\ A E F B &= \text{Increase in Government Revenue} \\ C A B &= P_1 P_0 A B - P_1 P_0 A C \\ \text{Since } P_1 &= P_0 + T \text{ Therefore, } C A B = P_1 P_0 A B - P_1 P_0 A C \\ &= \text{Gain in Consumer Surplus} - \text{Loss in Producer Surplus} \\ \text{Economic Value of Output} &= \text{Financial Value of Output} + \text{Change in Government Tax Revenues} + \text{Increases in Consumer Surplus} - \text{Loss in Producer Surplus} \end{aligned}$$

15

Measuring Distributive Impact from Financial and Economic Values of Inputs with Tariffs



$$\begin{aligned} \text{Financial Cost of Importable Goods} &= Q^d C F Q \\ \text{Economic Cost of Importable Goods} &= Q^d G H Q (E^s / E^m) \\ \text{Where } (E^s / E^m - 1) &= \text{Foreign Exchange Premium (FEP)} \\ \text{Difference (Financial Cost - Economic Cost)} &= G C F H Q^d - G H Q^d (E^s / E^m - 1) \\ &= \text{Gain in Tariff Revenues to Government} - \text{Loss in terms of forex premium from Additional Use of Foreign Exchange in Importing This Input} \end{aligned}$$

16

Annex 4: Course Materials for Applied Public Finance

PUBLIC FINANCE: OVERVIEW

Prof. Roy Kelly
Sanford School of Public Policy, Duke University
(roykelly@duke.edu)

Azerbaijan State Economics University (ASEU)
Spring 2010

1

COURSE OUTLINE (1)

Week 1:

- Introduction and Overview of Public Finance
- Role of Government / Welfare Economics

Week 2:

- Market Failures: Externalities and Public Goods
- Role of Central and Sub-national Governments

Week 3:

- Fiscal Policy—Linkages to Economic Growth
- Principles of Taxation
- Analytics of Taxation: Revenues, Efficiency and Incidence

2

COURSE OUTLINE (2)

Week 4:

- Revenue Growth and Stability: Tax Capacity/ Effort)
- Regulatory Pricing and User Charges
- Property Taxation

Week 5:

- Review and Midterm Quiz

3

COURSE OUTLINE (2)

Week 7:

- Consumption Taxes (Excises, Sales and VAT)

Week 8:

- International Trade Taxes
- Personal and Corporate Income Taxes

Week 9:

- Natural Resources Taxes
- Review

4

COURSE OUTLINE (3)

Week 10:

- Review and Final Examination

Course Assessment:

• Problem Sets	40%
• Quiz 1	25%
• Quiz 2	35%
Total	100%

5

- Sign up for the ASEUpublicfinance_subscribe@yahoo.com Under Comments; please write "Roy Kelly". You will then be accepted into the group.

- No Make Up Classes—if you miss a class, then get notes, announcements from classmates

- Learning by Doing! Learn Together, Work Together, but hand in separately. Free Riders don't Learn Much.

- Honest and professional behavior is critical. Help each other; but hand in own work. Cheating, copying, plagiarizing will be reported.

6

Applied Public Finance

Introduction and overview

- **What** is public finance? **Why** is it important?
 - Invisible *versus* visible hand
- **How?** What are major sources of finance?
- Fiscal functions
- Branches of public finance

Size and composition of public revenues and expenditures over time and across countries

7

PUBLIC FINANCE: Study of the Role of Government in the Economy

- WHEN SHOULD THE GOVERNMENT INTERVENE IN THE ECONOMY?
- HOW MIGHT THE GOVERNMENT INTERVENE?
- WHAT IS THE EFFECT OF THOSE INTERVENTIONS ON ECONOMIC OUTCOMES?
- WHY DO GOVERNMENTS CHOOSE TO INTERVENE IN THE WAY THAT THEY DO?

Gruber, 2007

8

<mkaly@uak.edu>

1. WHEN SHOULD GOV'T INTERVENE?

- Legal Framework
- Political and Administrative Process (Governance)
- Public Finance

Three Functions of Government

- **Stabilization**
- **Distribution**
- **Allocation**

Musgrave, 1959

9

STABILIZATION

Stabilize the economy at high levels of output and employment without creating excessive pressure on inflation.

Policy Instruments: monetary & fiscal instruments

Level of Government: Central Government

CONSIDERATIONS: Inflation rate, Unemployment rate, Interest rate, Exchange rate, Effective Tax rates

10

DISTRIBUTION

Equalize income between regions and people.
Establish the "safety-net" to ensure availability of basic needs: food, health, education, housing, water

Policy Instruments: Transfer Programs

Level of Government: Central Government

CONSIDERATIONS: Tax burden and expenditure beneficiaries

11

ALLOCATION

Provide public goods and create right regulations & incentives to allow private sector to allocate resources in a non-distortionary manner.

Policy Instruments: Production & Provision (public/private)

Level of Government: Central and Local Government

CONSIDERATIONS: *market failures; market imperfections*

- Funding on public goods: goods non-rival in consumption and exclusion not feasible (national defense, security, public parks etc.)
- Provision & regulation of utilities (roads, bridges, railways, water, electricity, telecom) and monopolies
- Correct market imperfections (externalities – pollution, public health, public education, etc)

Government Intervention can Improve Efficiency

12

2. HOW GOVERNMENT CAN INTERVENE?

- **Tax or Subsidize Private Sale or Purchase**
 - Taxes or Subsidies to raise or lower prices to influence levels of consumption / production
- **Restrict or Mandate Private Sale or Purchase**
 - Requirements for health insurance, education
- **Public Provision**
 - Public health care, education, roads
- **Public Financing of Private Provision**
 - Government reimbursement programs (prescriptions, ...)

13

3. EFFECTS OF GOV'T INTERVENTION?

Need to understand the direct and indirect impacts of government actions

- **Direct Impact: Assume no behavioral change**
- **Indirect Impact: Assume behavioral change**

Role of Empirical Public Finance:
Use of Statistics and Modelling to assess how people and firms might respond to policy interventions

14

4. WHY DO GOV'Ts DO WHAT THEY DO??

Normative Question: How things should be done?

Positive Question: Why things are the way they are?

Must rely on a political economy framework on how and why government decisions are made.

Need to Avoid Public Sector Failures

15

BRANCHES OF PUBLIC FINANCE

- **Fiscal policy**
- **Revenue policy and implementation**
 - Taxation (including tax expenditures)
 - Debt financing
 - Foreign aid
- **Budgeting and financial management**
 - Expenditure appraisal (project appraisal)
 - Organization of government
 - Decentralization and local government finance
 - Public enterprise management
 - Privatization and regulation

16

Principles of Financing Public Expenditures

- **BENEFIT PRINCIPLE** – Financing should be based on benefit received
 - User charges: voluntary transfer of resources to public sector from beneficiary for goods/services and covers *all or part of the cost of supply*
- **ABILITY-TO-PAY PRINCIPLE** – Financing should be based on ability to pay
 - Taxes: involuntary (legally sanctioned) transfer of resources to public sector. Tax captures a *share of market surplus* by raising the price *above the full cost of supply*.

Progressive, Regressive, Proportional

17

TYPES OF REVENUES

- **TAXES**
 - Including charges for rights (e.g. license or permit fees)
- **NON-TAX REVENUE**
 - Charges for services -- tolls, user charges
 - Income from property-- rents, royalty, property sales
- **FOREIGN AID**
 - Grants
 - Loans with some concessionary element (at least 25%)
- **DEBT FINANCING**
 - Foreign debt
 - Domestic debt
 - private savings
 - inflationary financing
 - Revenue or asset secured bonds

18

TYPES OF TAXES

- **Direct and Indirect**
 - **Direct taxes** have a real or legal entity as subject of the tax (eg, income, wealth and property taxes)
 - **Indirect taxes** target transactions such as international trade, sales, etc: (eg, VAT, sales, excises, Trade taxes)
- **Major tax bases**
 - Income
 - Consumption
 - International trade
 - Wealth/Properties
 - Rents -- natural resources, including land

19

REVENUE AND EXPENDITURE COMPOSITION AND TRENDS

- Size and composition of expenditures / revenues:
 - **OECD countries**
 - Does size of government always grow with GDP?
 - Is nature of government changing over time?
 - **World Wide**
 - How do government revenues and expenditures vary across countries by income group?
 - Will less developed and transitional economies follow same growth path in size and composition of revenues and expenditures as most developed countries have done?

20

Government Expenditures and Revenues as a Share of GDP in OECD Countries, 1870-1995

	About 1870	1913 WWI	1920	1937 WWII	1960	1980	1990	About 1995
EXPENDITURES								
Expenditures on labor, goods and services	4.6%			11.4%	12.6%	17.9%	17.4%	17.3%
Investment	2.0%	2.8%	3.4%	3.8%	3.2%	3.5%		2.9%
Transfers	1.1%			4.5%	9.7%	21.4%		23.2%
of which: Social Security								18.1%
Interest	2.5%	2.2%	3.1%	3.4%		3.1%		4.5%
Total expenditures	10.8%	13.1%	19.6%	23.8%	27.9%	43.1%	44.8%	45.6%
REVENUES								
Indirect taxes, customs	1.8%	1.7%	1.6%	2.2%			0.8%	0.5%
Indirect taxes, domestic	3.0%	3.0%	3.4%	4.9%	11.6%	11.8%		13.5%
Direct taxes	2.4%	2.6%	3.2%	3.4%	9.5%	13.5%		14.0%
Social security contributions					7.1%	10.8%		12.1%
Other receipts					3.4%	3.6%		3.3%
Total revenues	10.6%	11.8%	19.2%	21.6%	28.7%	40.1%	42.2%	43.4%
Gross public debt stock	47.9%	59.2%	66.3%	78.1%	42.9%	46.4%	60.4%	71.0%
Government employment as share of total employment	2.4%	3.7%		5.2%	12.3%		17.5%	18.4%

Vito Tanzi and Ludger Schuker, Public Spending in the 20th Century. Items do not always add to total in year due to missing values for member countries in some years

FISCAL TRENDS IN OECD COUNTRIES

- Large government and broad-based taxes on income and consumption are modern phenomena
- Customs duties have become negligibly small revenue source after GATT/WTO tariff reductions
- Real government expenditures are slowing down and flattening out
- Social security expenditures and contributions have grown considerably since 1930s
- Social security is operating at a deficit – drawing upon general revenues
- Significant variations in patterns across countries; particularly in social security revenues and expenditures

22

Composition of government revenues across all countries in 1998

Group of countries	Current revenue 1998 %GDP	Shares of revenue in 1998					
		Taxes on income	Social Security	Taxes on consumption	Taxes on international trade	Other taxes	Non-tax revenue
Low	14%	10% to 30%		35% to 50%	15% to 35%	2%	6% to 12%
Lower middle	14%	15%	9%	40%	9%	1%	12%
Upper Middle	22%	17%	22%	33%	4%	2%	9%
High	29%	28%	20%	28%	0%	3%	8%
Europe EMU	37%	28%	32%	26%	0%	3%	8%

World Bank Development Report 2000/2001

23

Total tax and trade tax yields by central governments in 123 countries grouped by income class over 1975-2000

	LIC	LMIC	UMIC	HI Non-OECD	HI OECD	ALL
GDP-weighted average total tax yields						
1975	13.32	16.44	17.59	11.64	29.12	28.27
2000	10.00	14.21	13.88	11.27	32.30	30.11
Increase	-3.32	-2.13	-3.70	-0.38	3.57	1.84
GDP-weighted average trade tax yields						
1975	4.21	2.83	2.94	2.28	0.48	0.66
2000	2.79	1.17	1.14	0.77	0.19	0.39
Increase	-1.42	-1.66	-1.80	-1.51	-0.29	-0.27
Trade tax shares						
For GDP-weighted average country						
1975	32%	17%	17%	20%	2%	2%
2000	28%	8%	8%	7%	1%	1%
Number of countries						
% of all countries in class	64%	63%	57%	13%	100%	59%
Population (billions)	1.819	2.021	0.124	0.007	0.899	4.870
% of total population in class	84%	78%	39%	22%	100%	81%
GDP (2000US\$, trillions)	0.740	2.145	0.775	0.141	24.521	28.323
% of total GDP in class	89%	64%	43%	24%	100%	91%

LIC = Low income country, per capita GNI in 2000 US\$ 765 or less; LMIC = Lower middle income country, \$765 and \$3,035; UMIC = Upper middle income country, \$3,036 and \$9,385; HI Non-OECD = High income, non-OECD country; HI OECD = High income OECD country.

Tax yield = tax revenues over GDP

Graham Glendon "Towards fiscally feasible and efficient trade liberalization," study prepared under the Fiscal Reform in Support of Trade Liberalization Project, DAI/USAID, May 18, 2006 <http://www.fiscalreform.net/research/research.htm>

Composition of government social expenditures across all countries in 1998

Public expenditures in 1998 as share of GDP on:					
Group of countries	Education	Health	Subsidies and current transfers	Total Expenditure	Social security contributions
Low	3.9%	1.0%		17.0%	
Lower middle	5.3%	2.2%	5.3%	18.8%	1.3%
Upper Middle	5.0%	3.0%	11.2%	22.8%	4.9%
High	5.4%	6.0%	17.5%	30.2%	5.7%
Europe EMU			23.6%	40.0%	11.9%

25

Composition of government social expenditures across all countries in 2003-04

Public expenditures as share of GDP on:				
Group of countries	Education	Health	Subsidies and current transfers	Total Expenditure
Low	4.2%	1.3%		15.8%
	<i>(17 countries)</i>			
Lower middle	3.5%	2.5%		
Upper Middle	4.5%	3.7%		
High	5.6%	6.7%	18.5%	28.9%
Europe EMU	5.1%	7.1%	26.5%	38.6%

26

TRENDS IN GOVERNMENT EXPENDITURES

Expenditures over time (1)

- Since 1870s, OECD government expenditures on real goods and service and capital investments grew from about 7% to 20% of GDP remaining constant since the 1980s.
- Expenditure priority have shifted from defense to health and education.
- Significant variability in expenditures across low and middle-income countries

27

TRENDS IN GOVERNMENT EXPENDITURES

Expenditures over time (2)

- Major growth in expenditures has been in transfer payments (primarily social security) from 1% to over 23% of GDP.
- Social security programs relatively small in low-income countries, systematic increase in social security expenditures as per capita income increases.

28

TRENDS IN GOVERNMENT REVENUES (1)

Over time (1)

- Since 1870s, OECD revenues increased from about 10% of GDP to about 40% of GDP in 1980, increasing now to about 44% of GDP.
- World Wars and introduction of social security schemes in 1930s resulted in introduction of broad based taxes: income taxes, followed by sales tax, social security contributions (generally payroll taxes), and by VAT replacing sales tax

29

TRENDS IN GOVERNMENT REVENUES

Over time (2)

- Customs duties peaked in 1930s and are now insignificant revenue source with rounds of trade liberalization under GATT/WTO over last 50 years.
- **Most less developed and transitional countries inherited broad-based taxes and relatively high central government revenues: now having to decentralize fiscal arrangements.**

30

TRENDS IN GOVERNMENT REVENUES

Revenue Trends across countries (1)

- **High-income countries receive about two-thirds of their tax revenues from direct taxes**
 - half from income taxes and remainder from payroll taxes funding social security with remainder from indirect taxes, primarily the VAT.
- **Low-income countries receive about two-thirds of their tax revenues from indirect taxes:** VAT, customs & excises

31

TRENDS IN GOVERNMENT REVENUES

Revenue Trends across countries (2)

- **Corporate income taxes exceed personal income taxes in low-income countries, vice versa in high-income countries**
- **Significant variation in tax revenues of central governments of countries:**
 - high-income countries (20-40% of GDP)
 - Low income countries (10-25% of GDP)

32

TAX REFORM TRENDS

- Growth in government size led to core concern about impact of tax structures on economic efficiency and stability
 - Social engineering (income redistribution) through tax systems in 1950s and 1960s led to high tax rates on high income groups and wide use of investment incentives.
- These generally failed, but caused major economic distortions. A tax reform trend reversal started in late 1970s

33

TAX REFORM TRENDS

- 1980s saw a general world wide tax reform trend responding to changing structures of economies, trade liberalization, regional trade blocs, globalization, open capital markets, and macro instabilities from the 1970s oil shocks.
- Tax reforms focused on issues arising from general principles of taxation. Some countries undertake continuous adjustments to tax structures; while others tend to respond more sporadically to build up of tax problems.

34

TAX REFORM IN PRACTICE (1)

Direct Taxes

Before	After
Personal Income Tax <ul style="list-style-type: none"> • high top rates (statutory rates up to 60%) • many rates • many exemptions 	<ul style="list-style-type: none"> • Top rates falling (30-35%) • Fewer rates • Fewer exemptions
Corporate Income Tax <ul style="list-style-type: none"> • high marginal tax rates • Incentives (including tax holidays) • Double taxation 	<ul style="list-style-type: none"> • top statutory rates converging • special incentives eliminated • corporate & personal income taxes integration

35

TAX REFORM IN PRACTICE (2)

Indirect Taxes

Before	After
Sales Taxes <ul style="list-style-type: none"> • Many rates • Many exemptions • Narrow base 	Value Added Tax <ul style="list-style-type: none"> • One positive rate & zero rate • Few exemptions • Broad base plus selective excises (cigarettes, liquor)
Import Duties (Trade Taxes) <ul style="list-style-type: none"> • Wide dispersal of rates • High tariff rates • Quantitative controls 	<ul style="list-style-type: none"> • Target of Uniform Tariffs • Top rates lowered • Trade liberalization

36

ROLE OF GOVERNMENT: Market Failures

Prof. Roy Kelly
Sanford School of Public Policy, Duke University
(roykelly@duke.edu)

Azerbaijan State Economics University (ASEU)
Spring 2010

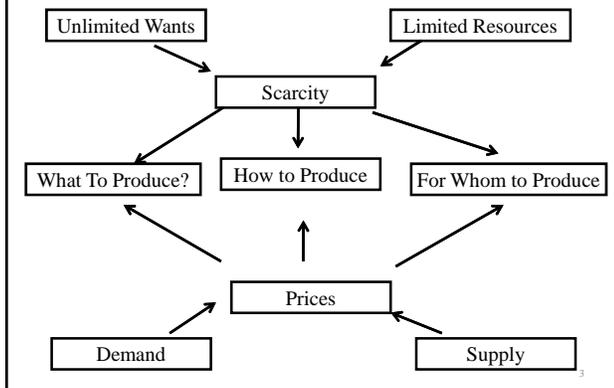
1

Topics to be Covered

- Introduction to Welfare Economics
- Application to Market Failures
- Case of Negative and Positive Externalities

2

BASIC ECONOMICS



3

Private Market Efficiency

- Perfectly competitive market: produce the right quantity, right time, lowest cost
- But perfect market is only possible if:
 - Perfect Information
 - Many Buyers and Sellers
 - No Externalities
 - No Public Goods

“MARKET FAILURES”

4

Market Failures

- Perfectly competitive markets are used as base case or norm
- When do they not work? Degrees of failure?
 - Under or over supply goods? or *efficient* supply?
 - Agenda for market correction (taxes, subsidies, regulation)
 - No supply at all? or is supply *feasible*?
 - Agenda for public provision or finance (as opposed to production)
- Characteristics of competitive markets:
 - ➔ Characteristics of production/consumption process
 - Characteristics of goods
 - Characteristics of production costs and markets

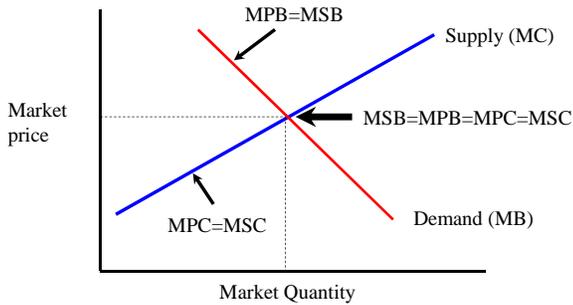
5

Review Basic Economics

- Microeconomics: Supply and Demand
- Introduction to Welfare Economics
Why?
 - To quantify the impacts of government policy, project evaluation, taxation, subsidies, regulation
 - To identify who will be impacted

**Basic Tools for an Economist:
Demand and Supply Curves**

Competitive market: no externalities



Two Basic Forces (D & S) interact to determine equilibrium where prices will be set to clear the market.

Market Demand Curve

- Sum individual demand to market demand curves
- Fix price and sum quantity demanded (horizontally)
- Demand = $f(\text{price}_x, \text{price}_o, \text{income, tastes, expectations, population and income distribution})$

Two ways of looking at the demand curve:

Horizontally: at given price, how many will be demanded?

Vertically: at any given amount, what is the “willingness to pay”?

8

THREE POSTULATES OF APPLIED WELFARE ECONOMICS

Basic postulates are used in:

- tax analysis
- cost-benefit analysis of projects and programs
- public sector pricing and regulation

9

THREE BASIC QUESTIONS

- What is the **value or benefit** of added goods and services produced and consumed in economy as a result of project or program or a result of a tax / subsidy?
- What is the **value or cost** of added goods and services used in economy as a result of project or program or a result of a tax / subsidy?
- How to **aggregate net benefits or costs** accruing to different groups in economy?

10

POSTULATE ONE

- The competitive demand price for a given unit of an item measures the value of that unit to the demander (or consumer)
- **Maximum willingness to pay (as revealed in competitive market) measures benefit of added goods and services consumed or the impact of a tax or subsidy.**
- Demand price is gross of taxes, but net of subsidies.

11

POSTULATE TWO

- The competitive supply price for a given unit of a good or service measures the minimum value of that unit to the supplier
- **Opportunity cost (or supply price, if added costs specific to project) measures minimum cost of added goods or services used to supply goods or services**
- Example of project specific costs: risk, transportation
- Supply price is gross of subsidies, but net of taxes

12

POSTULATE THREE

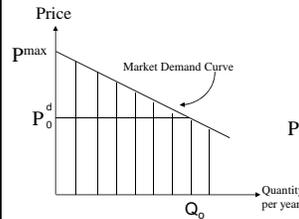
- Net costs and benefits accruing to different groups should be added up to determine overall economic benefits;

A dollar is a dollar no matter to whom it accrues

13

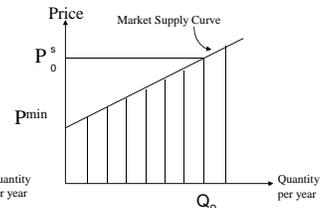
Illustration of Basic Postulates: Market supplies and demands

Postulate A:
(Maximum) Willingness to Pay



Gross benefit of Q_0 ?
Consumers' surplus from buying at P_0^d rather than above P^{max} ?

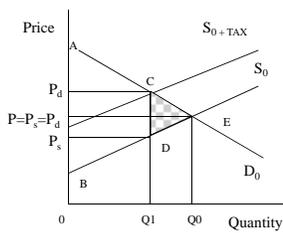
Postulate B: (Minimum) Supply Price (Opportunity Cost + Risk & Transaction Costs)



Economic cost of Q_0 ?
Producers' surplus from selling at P_0^s rather than below P^{min} ?

14

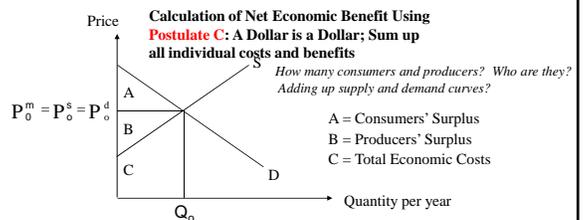
Illustration of Basic Postulates and Taxation



	Before Tax	After Tax
Total Benefits	AEQ ₀ 0	ACQ ₁ 0
Total Costs	BEQ ₀ 0	BDQ ₁ 0
CS	AEP	ACP _D
PS	BEQ ₀	BDP _S
Tax Revenue	----	PdCDPs
DWL	----	CED

15

Illustration of Basic Postulates and Cost/Benefit Accounting Framework



Net Economic Benefit (A+B)	= Total (Gross) Economic Benefit (A+B+C)	- Total Economic Cost (C)
Net Economic Benefit (A+B)	= Consumers' Surplus (A)	+ Producers' Surplus (B)
Consumers' Surplus (A)	= Total Economic Benefits (A+B+C)	- Total Fin Revenues (B+C)
Producers' Surplus (B)	= Total Fin. Revenues (B+C)	- Total Economic Cost (C)

Market Failures based on characteristics of consumption or production of good (1)

- Private market without externalities**
MPB = MSB
MPC = MSC
- Competitive private market without externalities**
MPB = MSB = MPC = MSC

17

Market Failure based on characteristics of consumption or production of good (2)

- Externalities of consumption**
 - Positive or negative byproducts of consumption affecting persons other than consumer
 - Lack of exclusion or property rights concerning use of good and/or byproducts
- Consumer not penalized for costs of negative byproducts (MPB > MSB) or not rewarded for positive byproducts (MPB < MSB)**
- Externalities of production**
 - Producer not penalized for costs of negative byproducts (MPC < MSC) or not rewarded for positive byproducts (MPC > MSC)

18

Definition of Externality

Externality is defined as a cost or benefit resulting from some activity or transaction that is imposed or bestowed upon parties external to the activity or transaction.

- An externality arises when the parties in a market transaction do not take account of benefits and costs that occur
- Many markets have externalities which could be regulated but at high cost. Thus, a trade off between the costs of the externalities and the regulatory costs.

19

Examples of Externalities

External Costs (Negative Externalities)

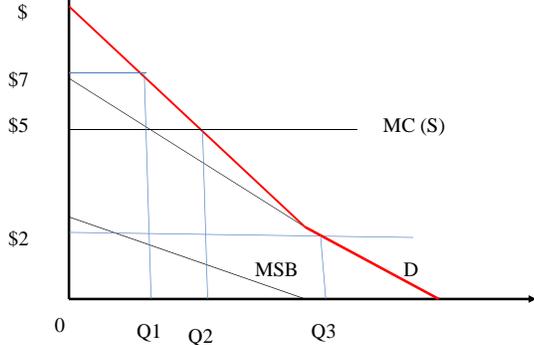
- Air pollution
- Congestion
- Noise

External Benefits (Positive Externalities)

- Education and Health
- Immunization Programs
- Home Improvements

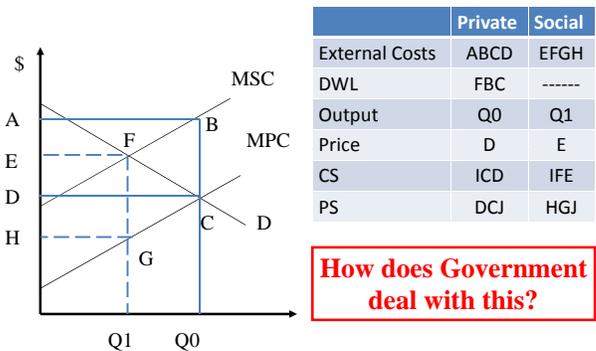
20

Welfare Impacts of Positive Externalities



21

Welfare Impacts of Negative Externalities



22

Government Options (1)

• Moral Persuasion (Coase, 1960)

- Basic issue of rights must be clear
- No cost to bargaining
- Only a few people involved

• Example: Rancher and Farmer.

Cows occasionally stray and destroy crops, thus an externality of cattle raising. If rights were established making crop damage a legal liability to the rancher, or if the farmer had an incentive to bribe the rancher not to destroy his crops.

Definition of Legal Rights affect the Distributional Impacts

23

Government Options (2)

• Antipollution Legislation/Regulation (Mandates)

- Immediate Results (don't wait for market)
- But can lead to inefficiencies (all treated same)
- Cost of enforcement/regulation (bureaucracy)

24

Marginal Cost to Reduce Unit of Pollution by Firm			Marginal Cost to Reduce Unit of Pollution by Society		
Units	Firm A	Firm B	Unit	Cost	Firm
1	100	250	1	100	A
2	200	350	2	200	A
3	300	600	3	250	B
4	400		4	300	A
5	500		5	350	B
			6	400	A
			7	500	A
			8	600	B
			Total	2,700	

Impact of Government Regulations:

If 100% Reduction:
 A pays \$1,500
 B pays \$ 1,200

If 50% Reduction (2 each):
 A pays 300
 B pays 600
 Total = \$900

What is Lowest Economic Costs? \$850

Government Options (3)

- **Pollution Taxes / Subsidies**
 Try to internalize costs through imposing a tax

Options on What to Tax?

- Tax pollution itself or on input creating pollution

```

graph LR
  Inputs[Inputs] --> Process[Process]
  Process --> Outputs[Outputs]
  Process --> Pollution[Pollution]
  
```

Government Fiscal Options (3)

Pros:	Cons:
<ul style="list-style-type: none"> • Easy to Administer • Allows largest polluter to reduce • Gets Revenues • Encourages polluters to find optimal technology 	<ul style="list-style-type: none"> • Hard to estimate Externality • Still may pollute after paying tax

Types of Taxation Instruments used to Subsidize Pollution Reduction:

- Investment tax credit
- Expensing
- Accelerated Depreciation
- Tax Deferment / Exemption if firm used capital goods that cause less pollution

Taxation to “tax” pollution:

- Tax on motor fuels (leaded): most of OECD
- Carbon Tax : Finland (1990)US\$24.30/ton of CO2, Quebec (2007)

Fiscal Approach To Pollution Reduction

- **Fiscal Approach (Subsidies or Taxes)**
 Both subsidies and taxes can achieve efficient results

Subsidy

If k= 200, A will reduce 2 units; B = 0 units

If K = 300, Firm A will reduce 3 Cost = 600 Subsidy received = 900 Gain = \$300	If K = 300, Firm B will reduce 1 Cost = 250 Subsidy received = 300 Gain = \$50
--	---

How much is Government Total Subsidy? US\$1,200

Taxes

If T = 300, Firm A will reduce 3
 Pay Tax on 2 remaining units
 Total Tax = \$600

If T = 300, Firm B will reduce 1
 Pay Tax on remaining 2 units
 Total Tax = \$600

How much is Government Total Taxes? US\$1,200

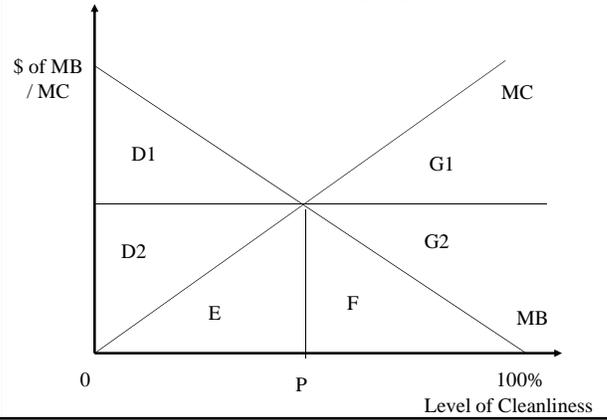
Both subsidies and taxes lead to an efficient solution.
 BUT distribution impact is very different.

Subsidy: all taxpayers will pay the taxes which are used to pay the subsidies

Taxes: the polluter will pay the taxes (but incidence depends on relative elasticities)

31

Welfare Impacts of Managing Externalities



ROLE OF GOVERNMENT: Market Failures

Prof. Roy Kelly
Sanford School of Public Policy, Duke University
(roykelly@duke.edu)

Azerbaijan State Economics University (ASEU)
Spring 2010

1

Topics to be Covered

“Market Failures”

- Information Asymmetries
- Public Goods
- Monopolies

2

Review of Private Market Efficiency

- Perfectly competitive markets are used as base case or norm
 - When do they not work? Degrees of failure?
 - Under or over supply goods? or *efficient* supply?
 - Agenda for market correction (taxes, subsidies, regulation)
 - No supply at all? or is supply *feasible*?
 - Agenda for public provision or finance (as opposed to production)
 - Characteristics of competitive markets:
 - Characteristics of production or consumption process
- ➡ Characteristics of goods
- ➡ Characteristics of production costs and markets

3

1 Characteristics of goods (a)

Complete information on quality of good or service and prices

Opposite: Incomplete information

- Risks of losses (death, disability, damage to property, failure to perform, etc),
- Transaction costs to acquire information to reduce risks (financial sector with third party managing funds; labor markets)
- Issues of **consumer protection**. Common in health and food & beverage sectors (or in any situation where trial-and-error approach to consumption testing has unacceptably high risks of death or disability)

4

1. Characteristics of goods (b)

- Private goods are rival in consumption
 - Only consumer benefits
 - Consumers willingness to pay is total benefit
 - No one else willing to pay for change in consumers level of consumption (no interpersonal utility)
 - No charity, social sanctions, etc

Opposite: **Merit and demerit goods**

Merit goods are basis of charitable giving and basic needs
- Pure public goods are **non-rival in consumption**
 - Benefit to economy is sum of benefit to all consumers
 - Private supplier has difficulty in assessing and collecting willingness to pay for benefit from all beneficiaries leading to no or under supply
 - Examples?

5

Public Goods

• Exclusion is feasible

- Supplier can prevent consumption unless willing to sell/transfer
 - Feasible: enforceable legal rights, physical barriers, technology (surveillance cameras, etc) or force
- Supplier can charge and receive price; consumer has to reveal preferences*

Opposite: Exclusion not feasible or common property rights

- Free rider problem
- “Tragedy of the commons”
 - over consumption of natural resources (fisheries, watersheds, grazing lands, etc)

6

Classification of Private and Public Goods

		Rival in consumption?	
		YES	NO
Exclusion from consumption?	YES		
	NO		

How to classify TV broadcast, road usage, public park, public concert, etc?

How can public goods be made private?

7

How to Measure the Demand for Public Goods?

- Horizontal versus Vertical Summation of Demand
- **Optimal Provision of Private Goods:** Consumers demand different quantities of the good at the same market price: Optimal provision is where MSB for next unit by any consumer equals the MSC
- **Optimal Provision of Public Goods:** Consumers must consume the same quantity, but have different willingness to pay: Thus, *optimal provision is where sum of MB for all consumers equals the marginal cost*

8

Free Rider Problem in Public Goods?

- Free Rider Issue:

Example: Dam to stop flooding

Population: 10 Households

Cost for the Dam: \$5,000

Benefits to the Dam: \$10,000

Cost/HH = \$500 / HH

Would all 10 households agree?

What if 1 household didn't agree? (Cost of exclusion, WV)

9

- Free Rider Issue:

Other Examples:

Dam

Public Radio Stations & BBC

File-Sharing Software (Gnutella/Kazaa)

- But does Govt have to provide public goods?

– Not necessarily (depends on legal structures)

Eg: Business Improvement Districts in NY and MA

Light Houses (private) in UK up to 1842

File Sharing Rules (Kazaa)

10

Examples of Public Goods

• Non-rival goods

- Legal and judicial system (property rights and contracts)
- Monetary and financial system (value, transaction value and risk reduction)
- Public security
- Public/existing information (no copy right or patent; no intellectual property rights)
- Public broadcast & underutilized broadcast wavelength bands
- Public health and consumer protection
- Underutilized or sustainable renewable natural resource
- Uncrowded public infrastructure

• Mixed goods

- Basic needs goods (merit goods)
- Education
- Health
- Water and sewage
- Solid waste removal
- Electric power
- Ports and public transportation
- Communications

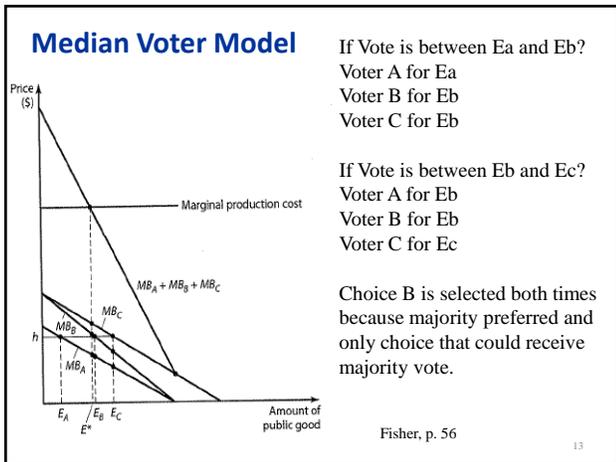
11

How do we Determine the Right Quantity of a Public Good?

- How to get revealed preference?
- Problem of Survey without Actual Costs.
- Voting?

Median Voter Choice Model

12



Voting Dilemma: When Preferences are not Single-Peaked, Order will determine outcome

GROUP	ROAD	BRIDGE	DAM
1	1	2	3
2	3	1	2
3	2	3	1

Option 1:

- Choose between road and bridge: Road would Win
- Choose between Road and Dam: Dam would Win

Option 2:

- Choose between bridge and dam: Bridge would Win
- Choose between Bridge and Road: Road would win

Sequencing Voting Matters: Who Sets the Agenda?

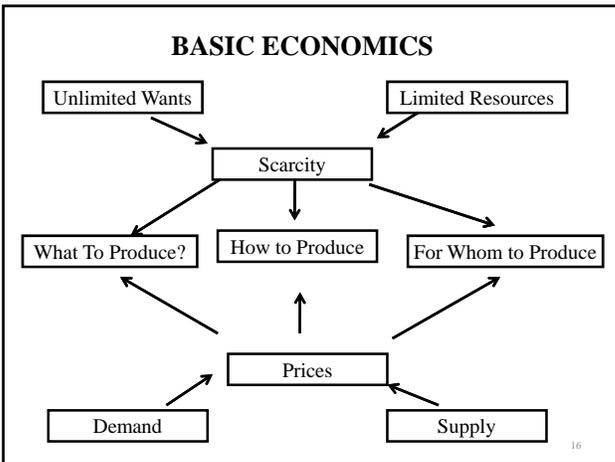
2. Characteristics of production costs and markets: Monopolies

Lack of Many Buyers and Sellers: Failure in the market structure

Extreme Example: Monopoly

Definition of a Monopoly

“An industry comprised of only one firm that produces a product for which there are no close substitutes and in which significant barriers exist to prevent new firms from entering the industry.”



Monopolies as Sole Producer

As sole producer, Monopolies control the market price and the quantity produced, thus they must ask the question of:

- How much to produce
- How to produce
- How much to demand from each input market
- What price to charge

Monopoly

- Non-Competitive Markets: where firm can affect the price charges, rather than being a price taker
- Monopoly results in lower output and higher prices

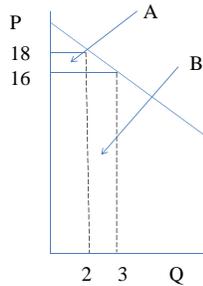
How do Monopolies emerge?

- Legal barriers set up by Government: (a) natural monopolies (eg, water supply, telephones, cable) due to increasing returns to scale, (b) easier to control (alcohol/lotteries), or (c) equitable access for the poor
- Legal barriers (patents): govt protect a patent/copyright
- Economies of Scale, capital cost advantage
- Ownership of scare factor of production (diamond mine)

Option: Restructure, Regulate or Provision

How Can Monopoly Sell More?

P	Q	TR	MR
20	1	20	20
18	2	36	16
16	3	48	12
14	4	56	8
12	5	60	4
10	6	60	0
8	7	56	-4
6	8	48	-8



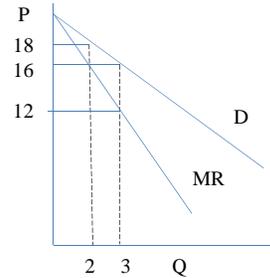
To sell more,
lower price &
accept lower
price for all
previous items

Where $MR = dTR/dQ$ MR will fall at twice the rate as demand

19

How Can Monopoly Sell More?

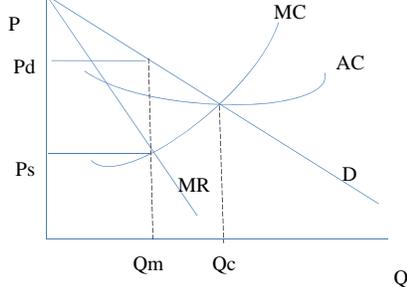
P	Q	TR	MR
20	1	20	20
18	2	36	16
16	3	48	12
14	4	56	8
12	5	60	4
10	6	60	0
8	7	56	-4
6	8	48	-8



Where should monopolist set the price? At \$18 or \$16?

20

Maximizing Profit for Monopoly



Rules:

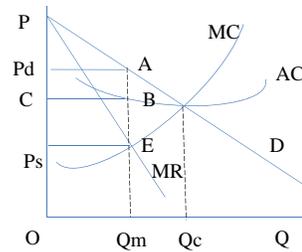
Expand to where
 $MR=MC$

Should we
expand to Q_c ?
Why or Why
Not?

What is the "Monopoly Tax?" ($P_d - P_s$)
What is the Social Welfare Cost?

21

Monopoly "Profits"

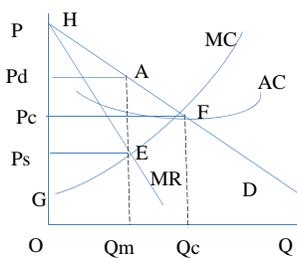


Output	Q_m
Price	$P_d = P_m$
Total Revenue	$Q_m A P_d O$
Total Costs	$Q_m B C O$
Profit	$P_d A B C$

If Free Competition—entry would occur due to excess profits
But due to barriers to entry = profits continue

22

Economic Costs of Monopolies



	Perfect Competition	Monopoly
Price	P_c	$P_d = P_m$
Quantity	Q_c	Q_m
CS	$H F P_c$	$H A P_d$
PS	$G F Q_c$	$P_s E G$
Welfare Cost	-----	$A E F$

Results: Monopoly gains larger share of smaller pie, resulting in social welfare costs from under-producing demanded goods.

23

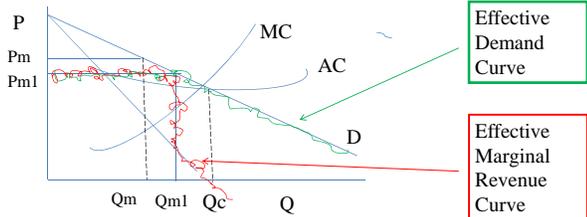
Government Anti-Monopoly Policies

- Anti-Trust Laws: break up to improve competition (Sherman Antitrust Law 1890)
- Government Ownership: internalize profits (State Owned Enterprises)
- Price Ceilings**
- Taxes (profits tax or Per Unit Tax)**

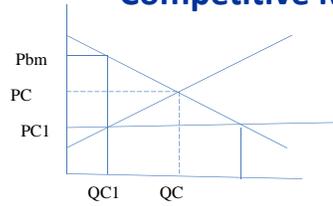
24

Price Controls

- Price Controls used in natural monopolies (electricity, water)
- Regulatory Commission established to control prices while allowing a "fair return"



What about Price Controls on Competitive Markets?

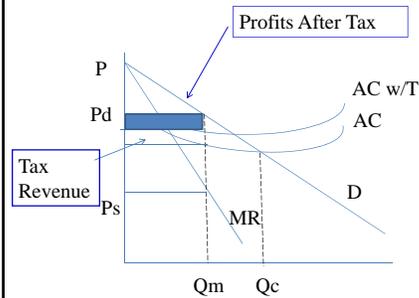


- Limits price, creates excessive demand
- Market bids up price to black market price
- Introduces social welfare costs
- Must Ration: Queue, Lottery, Vouchers, Black Mkt

Taxation Options (1)

- Lump Sum Tax (Excess Profits Tax)
 - Tax on the surplus, not affecting the supply curve or demand
 - Excess profits tax doesn't depend on how much is produced or what price is charged: Fixed Costs
 - As a Fixed Cost, it affects the Average Total Cost
 - Impacts of Tax (Good Tax)
 - P_m remains unchanged
 - Q_m remains unchanged
 - Social Costs remains unchanged
 - Monopolist Profits is reduced by tax amount

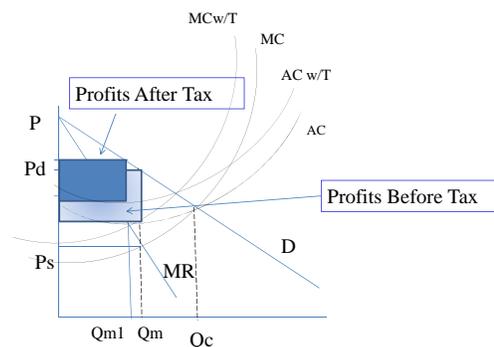
Lump Sum / Excess Profits Tax



Taxation Options (2)

- Excise Tax on Inputs (per unit tax)
 - Tax on units sold, shifting MC and ATC curve
 - Impacts of Tax:
 - P_m goes up
 - Q_m goes down
 - Social Costs increases
 - Monopolist Profits is reduced by tax amount

Excise Tax on Monopoly

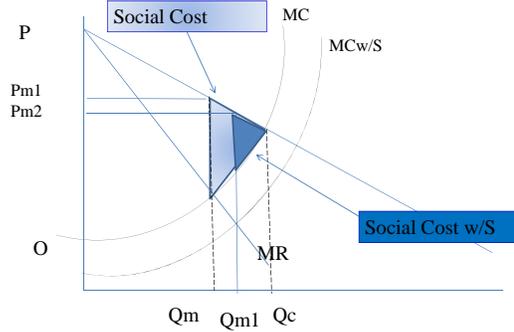


Subsidy Option

- Subsidy on Inputs (per unit subsidy)
 - Subsidy on units sold, shifting MC and ATC curve
 - Impacts of Subsidy:
 - Pm will fall
 - Qm goes increase
 - Social Costs will decrease
 - Monopolist Profits will increase depending on ATC curve

31

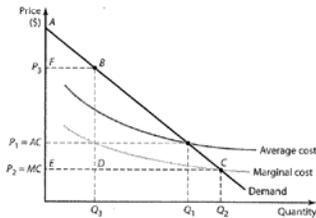
Subsidy Option



32

Natural Monopoly

- Natural Monopoly exists if production of good/service exhibits increasing returns to scale, so that the long run average costs continually decreases as output increases.



Examples:

- Electricity
- Water
- Public Transit
- Gas Pipes

33

Government Services and Rationale

Types of Services	Public Good / Externality / Information / Monopoly	Central or Local Level
Education (cultural events, libraries)	Externality, monopoly (higher education), redistribution	C/L
National Defense / Police	PG, externalities	C (L police)
Fire Protection	Ext, PG, excludable in non-urban	L
Public Health	Ext, PG, Redistribution	L / C
Sanitation / Water Supply	Ext, monopoly	L
Communications (roads, TV)	Info, Mono, PG	L, C
Agricultural Services (irrigation, ext services, MKT s)	Econ of scale, info, mono, ext,	L, C
Leisure Activities (Parks, open spaces)	Inefficient, Semi Public Good	L
Post Office	Monopoly (excludable)	C
Cemeteries	Ext, income redistribution	L
Human Services / Welfare Programs	Redistribution, PG	C
Solid Waste	Ext, mono (land fill)	L

Market Failures: Policy Options

Market Failure	Government Options	Examples
Imperfect Information	Provide Information	Consumer Protection Laws Truth in Lending Practices Extension Workers
Monopolies	Break Up Regulate Provide Service by Govt	Telephone Company (ATT) Tobacco Company Cell Phones
Externalities (Negative/Positive) (Spatial Externalities)	Prohibit Regulate Taxes Subsidies	Pollution/Traffic Congestion Public Education Light House Vaccination (Public Health)
Public Goods (Collective Goods)	Provision Production (or private sector)	Light House National Defense Semi-public goods (health /education)

DECENTRALIZATION AND LOCAL GOVERNMENT FINANCE

Prof. Roy Kelly, PhD
Sanford School of Public Policy, Duke University
(roykelly@duke.edu)

Azerbaijan State Economics University (ASEU)
Spring 2010

1

DECENTRALIZATION: AN INTERNATIONAL PHENOMENON

- ECONOMIC AND SOCIAL DEVELOPMENT
- IMPROVE SERVICE DELIVERY EFFICIENCY AND ACCOUNTABILITY
- GOVERNMENT REENGINEERING, PRIVATIZATION, AND DECENTRALIZATION
- DECENTRALIZATION: REALLOCATING FUNCTIONS AND FINANCES ACROSS GOVERNMENT LEVELS

**DECENTRALIZATION IS A PROCESS
A MEANS -- NOT -- THE END**

2

DECENTRALIZATION: AN ONGOING PHENOMENON

- IN OVER 85 COUNTRIES
- POLITICAL AND ECONOMIC RATIONALE
- VARIETY OF COMPONENTS & APPROACHES/SEQUENCING
- POLITICAL, FISCAL AND ADMINISTRATIVE COMPONENTS

Decentralization: Ultimately a Political Decision

BUT Success depends on Comprehensive Approach of Political, Administrative and Fiscal Aspects

3

WHY REFORM THROUGH DECENTRALIZATION?

- **Improves Efficiency**
 - Links mix and level of services to the local citizen demand
- **Improves Political and Financial Accountability**
 - Brings Government Closer to the People
- **Improves Effectiveness**
 - Mobilizes citizen participation, innovation and ownership
 - Allows competition in public services ("best practices")

**Decentralization is essentially
a Political Decision NOT Technical Problem**

4

DECENTRALIZATION DESIGN ISSUES

Complicated Process

- Multiple Stakeholders
- Multidisciplinary (political, fiscal, institutional)
- Comprehensive (policy and administration)

Potential Problems?

- Macroeconomic instability
- Increased regional inequality and conflicts
- Declining service levels
- Increased Corruption

DESIGN AND IMPLEMENTATION STRATEGY IS CRITICAL

STRATEGY MUST BE COUNTRY SPECIFIC

5

STRUCTURING AN INTERGOVERNMENTAL FISCAL SYSTEM

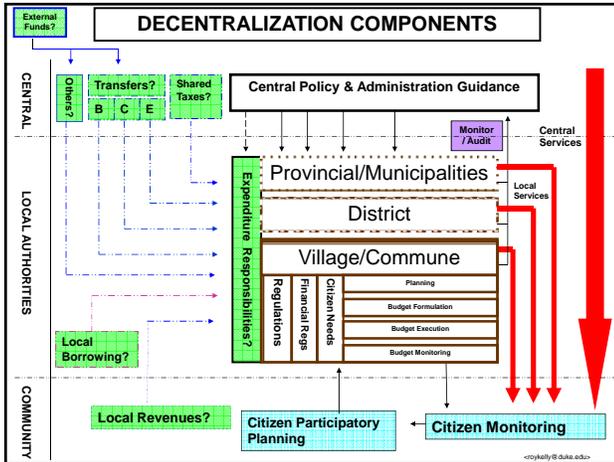
PILLARS OF FISCAL DECENTRALIZATION

- Rationalize Expenditure Responsibilities
- Rationalize Revenue Sources
- Structure Intergovernmental Transfers
- Structure Local Level Borrowing/Debt

Within context of:

- Legal Framework
- Institutional Structures
- Systems and Procedures
- Central, Local and Community Oversight
- Central / Local Capacity

6



ROLE OF PUBLIC FINANCE

National Framework (Musgrave, 1959)

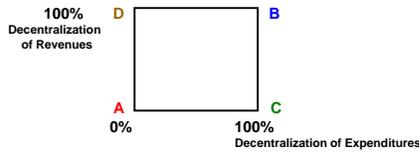
Stabilization: Stabilize the economy at high levels of output and employment without creating excessive pressure on inflation

Distribution: Equalize income between regions and people.

Allocation: Provide certain public goods and create an appropriate regulatory framework to allow private sector to allocate resources in a non-distortionary manner.

8

FISCAL DECENTRALIZATION MODELS



Model Description

- A Complete Centralization**
- B Complete Decentralization**
- C Centralized Revenues and Decentralized Expenditures**
- D Decentralized Revenues and Centralized Expenditures**

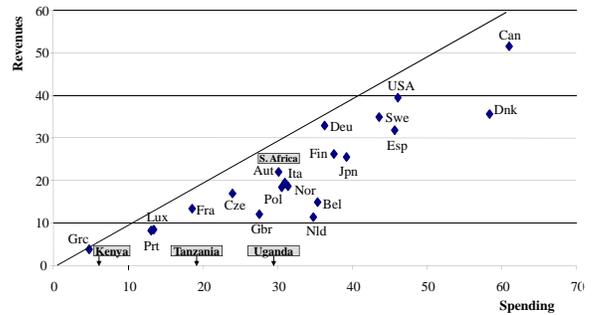
Model	Stabilization	Distribution	Allocation
A	+	+	?
B	+	+	?
C	+ (p)	+ (p)	+
D	-	- (p)	-

DIVERSITY IN THE REAL WORLD

9

OECD Decentralisation Ratios (2004)

Share in general government revenue and expenditure



Source: Steffensen, 2008 from National Accounts of OECD 2005

10

FISCAL DECENTRALIZATION

The Four Pillars:

- Allocating Expenditure Responsibility
- Allocating Revenue Sources
- Designing Intergovernmental Transfers
- Structuring Local Borrowing/Debt

✓ Establish institutional systems and capacity

✓ Mobilize political and administrative will

11

FD PILLAR #1: Assigning Expenditure Functions

Financing should follow function.

Basic Principle for Allocating Functions:

Correspondence Principle (Subsidiarity)

To increase efficiency, public services should be provided by the jurisdiction having control over the minimum geographic area that would internalize benefits and costs of such provision. (Oates, 1972)

KEY: maximize efficient and accountable decisionmaking for improved service delivery

Success demands a combination of good governance, policy, management and technical capacity, systems and procedures and financial resources.

12

Why should Finance follow function?

Why?

- To identify need for funds
- To ensure adequacy of funds (hard budget)
- To promote efficiency (type of revenues)

Local governments provide different types of goods and services, including

- Excludable Club goods
- Local public goods
- Social services

Local expenditure functions should be financed depending on the nature of the good or service provided

Adapted from Boex, 2008

13

Local Government Functions

THE CLEAR CHOICES

National Public Good: National Defense, Macroeconomic stability, Distribution

Local Public Good: Local level Services (e.g., garbage, fire services, water distribution)

THE DIFFICULTY:

- Most goods don't fit these extreme categories so nicely (especially education and health)
- Most goods must be evaluated on a multi-dimensional basis (i.e., must split provision decision by function), considering correspondence principle, benefit areas of services, externalities, economies of scale, and best international practice

14

croyle@duke.edu

Use First Principles: Public Finance

Applications to primary Education in India

What are the First Principles of Public Finance?

Principle	Explanation	Implication
Economies of Scale	Unit Cost of production declines as scale of production increases	• Activities with significant economies of scale should be done by a higher level of government
Externalities	The actions of one agent affects other agents	• Activities with significant externalities should be done at a higher level of government, so that the "external" effect can be "internalized" in the system
Equity	Need for equitable spread in inputs, process or outcomes	• Equity may imply financial support to education at a large enough geographic scope to allow for redistributive transfers to equalize across smaller units
Heterogeneity of Demand	Variation in local needs and preferences between regions	• The more heterogenous the demand for the activity is likely to be, the more locally it should be done

See Pritchett and Pande, "Making Primary Education Work for India's Rural Poor: A Proposal for Effective Decentralization", World Bank South Asia Series Working paper No. 95, 2006

15

Use First Principles – Public Finance

Functional Allocation according to First Principles of Public Finance

Function	Public Finance First Principle			
	Economies of Scale	Externalities / System-wide Effects	Equity	Heterogeneity of Demand
Standards Setting	State	State	State	State
Planning	State	State	State	State
Asset Creation	GP	GP	GP	GP
Operation - Non teacher	GP	GP	GP	GP
Operation - Teacher	GP	GP	GP	GP
Monitoring and Evaluation	State	State	State	State

State
District
Block
GP
School

Standard Setting and Monitoring by State Government, and Asset Creation and Operation by low-level PRIs is effective

See Pritchett and Pande, "Making Primary Education Work for India's Rural Poor: A Proposal for Effective Decentralization", World Bank South Asia Series Working paper No. 95, 2006

16

croyle@duke.edu

FD PILLAR #2: Structuring Revenues

REVENUE TRANSFERS → Received by Local Level

- Central-Local Transfers (block, categorical, equalization)
- Shared Taxes (eg, income taxes, VAT, property taxes, fuel taxes)

LOCAL OWN REVENUES → Levied by Local Level

- **Local Fees and Charges and Own Taxes**
 - User Charges, Fees & Licenses
 - Business Taxes (license / permits)
 - Property Tax and Land-Based Charges
 - Vehicle and transportation-related taxes
 - Income (payroll tax) and Sales (selective excise taxes)
- **Local Surcharges / Piggyback Taxes (with Local Rate Discretion)**

FISCAL DECENTRALIZATION CHALLENGE:

Ensuring sufficient own source revenues to ensure autonomy, accountability, and efficiency gains from decentralization.

croyle@duke.edu

WHY LOCAL OWN REVENUES?

- Realizes decentralization efficiency gains
- Promotes accountability and ownership
- Ensures local autonomy
- Facilitates cash flow management
- Reduces incentives for extra-budgetary funds

What is a Local Revenue?

1. LG receives the revenues?*
2. LG sets the tax rate?*
3. LG administers the revenue?*
4. LG sets the revenue base?*

18

croyle@duke.edu

Local own revenues require discretion (at the margin) in **tax rates** and **administration**.

Local own revenues are a **necessary** but **not sufficient** condition for **effective fiscal decentralization** and **improved service delivery**

BUT Some Challenges of Local Taxation:

- Tax bases are unevenly distributed often in Capital cities
- Few high yield taxes at the local level
- Administration incentives for central versus local admin capacity

THUS:

- Need for local revenue “at the margin”
- Need for formula-based transfer system vs shared taxes
- Need for simplified policy and administration with incentives

TYPICAL LOCAL REVENUES (Tax and NonTax)

- Non-Tax: Some User Charges and Fees/Licenses
- Property Tax and Land-Based Charges
- Business Taxes (Permits)
- Vehicle and transportation taxes
- Income (Payroll Tax)
- Sales (Retail)
- Piggyback Taxes (with Local Rate Discretion)
- Tax Sharing and Central-Local Transfers

Need to move from overreliance on a Shared Tax System to allow increasing emergence of Independent Local Own Revenues.

FD Pillar #3: CENTRAL-LOCAL LEVEL TRANSFERS

REVENUE TRANSFERS → **Received by Local Level**

- Central-Local Transfers (block, categorical, equalization)
- Shared Taxes (eg, income taxes, VAT, property taxes, fuel taxes)

Dominant revenue source for subnational levels in most countries:

South Africa	85%	Nigeria	67% to 95%
Indonesia	72%	Mexico	70% to 90% (poorer states)
Provinces	72%	Pakistan	82% to 99%
Local	85%		

Source: Shah, 2002

Design of grants affects efficiency, equity and fiscal discipline.

INTERGOVERNMENTAL FISCAL DILEMMA

BASIC ALLOCATION DECISIONS:

EXPENDITURES: Primarily Local
REVENUES: Primarily Central

CREATES: FISCAL IMBALANCES:

VERTICAL IMBALANCE (Between Central and Local)
HORIZONTAL IMBALANCE (Among Local)

KEY IS:

How to combine **advantages from decentralizing major expenditures** with the **advantages of centralizing major revenue sources?**

Important Role of Intergovernmental Fiscal Transfers

CENTRAL-LOCAL GRANT STRUCTURE

Key Components:

- **Size of the Pool**
(ad hoc, percentage, reimbursement basis)
- **Allocation Criteria**
(derivation, formula, cost reimbursement)
- **Distribution Approach**
(general/selective, matching & non-matching)

Ensure Predictability, Transparency and Accountability

CENTRAL-LOCAL GRANT STRUCTURE

Method of allocating total among eligible units	Method of determining total to be distributed		
	Specified share of central tax (or % of GDP/Taxes)	Ad hoc decision	Reimbursement of approved expenditures
Origin of collection of the tax	A	----	---
Formula	B	F	---
Total/partial cost reimbursement	C	G	K
Ad hoc	D	H	---

CLARIFY OBJECTIVE TO DESIGN SOLUTION

- Political Influence / Control
(ad hoc block / categorical, matching/non-matching)
- Close the fiscal gap
(reassign responsibilities, tax sharing or general grants)
- Equalize fiscal capacity/needs
(formula general grants)
- Adjust for spillovers
(expand boundaries to internalize, specific matching grants)
- Increase central expenditure effectiveness
(specific matching grants)

25

<roykelly@duke.edu>

FD PILLAR #4: Subnational Debt

1. Should local authorities be allowed to borrow?
2. How should local borrowing be managed/controlled?
3. How to handle 'fiscally-distressed' local authorities?

Rationale for Debt Financing

- Short Term Cash Flow Problems
 - Matching expenditure and tax flows
- Financing Long-Term Capital Expenditures
 - Inter-temporal nature of large capital investments (benefits)
 - Lumpy investments
- Promote Market Discipline and Efficiency in Capital Allocation

<roykelly@duke.edu>

Establishing a Debt Policy

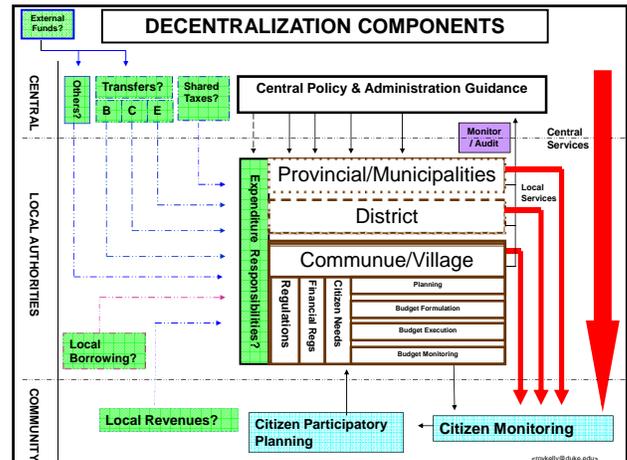
Why?

1. Sets financial parameters for the issuance of debt—helps to establish acceptable levels
2. Debt policies give investors and credit service monitors evidence of the government commitments
3. Debt policies provide consistency and continuity for public policy development to guide decision makers.

What is a Debt Policy?

- Purposes for allowable debt
- Legal debt limitations
- Issuance criteria and types of debt
- Method of sale and structures
- Disclosure requirements
- Handling and investments of proceeds
- Identify persons legally authorized to issue
- Dealing with defaults (fiscal crisis)

27



<roykelly@duke.edu>

FISCAL POLICY: LINKAGES TO ECONOMIC DEVELOPMENT

Prof. Roy Kelly, PhD
Sanford School of Public Policy, Duke University
(roykelly@duke.edu)

Azerbaijan State Economics University (ASEU)
Spring 2010

1

FISCAL POLICY

Fiscal policy includes decisions on

- **Size and allocation of government expenditure** to achieve targets for
 - Growth
 - Poverty reduction and other distributional impacts
 - Macro stability
- **Financing of expenditures** through taxes, non-tax revenue, foreign aid and debt financing taking into consideration economic efficiency, distributional and macro stabilization effects of revenue and debt policies

Expenditure, tax revenue, non-tax revenue, foreign aid and other donations, and debt policy are all subcategories of fiscal policy

Budgeting and Expenditure Analysis

Budgeting Issues (Public Financial Management)

- Recurrent Budget
- Capital Budget (Development Budget)

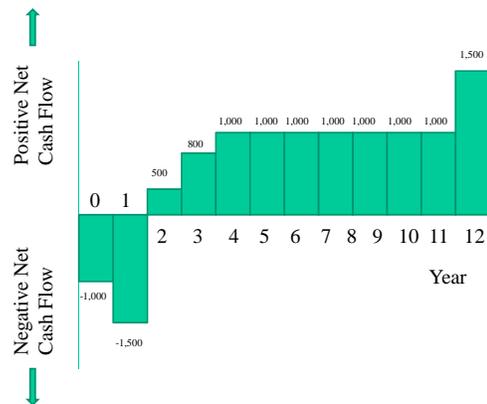
Capital Budgeting—Project Appraisal

Key is to maximize social benefits (cost/benefit analysis)

How?

- Develop Net Cash Flow on revenues and costs
- Discount cash flow to account for time value (adjust for inflation)
- Choose Options based on investment criteria (NPV) ₃

3



4

Fiscal Policy Impacts on Economic Growth

Fiscal policy impacts on

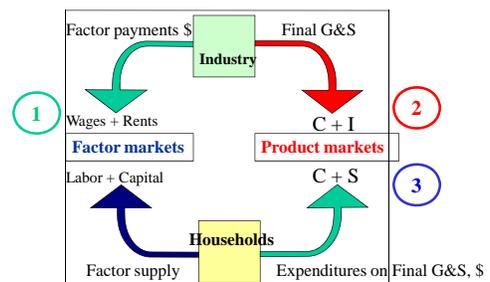
- **Savings, investment and growth**
 - Role of government as a saver and investor to stimulate economic growth

Macroeconomic and fiscal planning is first step in budgeting to set revenue and expenditure targets

- Consistency between growth targets, investment requirements and sources of savings.

5

Closed Economy; No Government

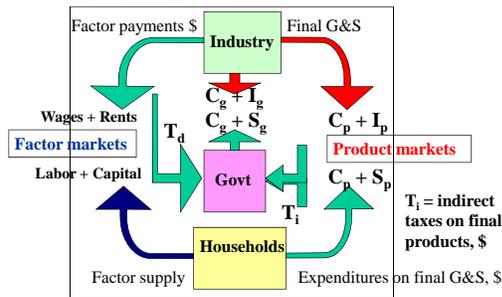


Industry = $\Sigma(\text{value added at all stages of production})$
 $GDI = \text{Wages} + \text{Rents} = C + I = \text{GDP}$

Households
 $GDI = \text{Wages} + \text{Rents} = C + S = \text{Expenditures} = \text{GDP}$
 or $S = I$

6

Closed Economy; Government



GDP at factor prices = Wages + Rents = $C_p + I_p + C_g + I_g - T_i$ (Sources of income)
 GDP at market prices = $C_p + I_p + C_g + I_g = GDI = C_p + S_p + C_g + S_g$ (Uses of income)
 or $I_p + I_g = S_p + S_g$
 Private sector: Wages + Rents - $T_d = C_p + S_p$ or $S_p = GDI - Taxes - C_p$
 Government sector: Taxes = $C_g + S_g$ or $S_g = Taxes - C_g$ 7

Gross Domestic Product (GDP)

Market Prices:

$$Y = C + I + G \text{ (Sources of Income)}$$

$$Y - C_p + C_g + S_p + S_g \text{ (Uses of Income)}$$

$$I_p + I_g = S_p + S_g$$

$$\text{Where } S_g = \text{Taxes} - C_g$$

Where

C_p is private consumption I_p is private investment S_p is private savings
 C_g is government consumption I_g is government investment S_g is government savings

Savings, Investment and Growth

Simple growth model (Harrod-Domar)

$$Y = \text{GDP}$$

$$gY = \text{growth rate in } Y \text{ in a year} = dY/Y$$

$$k = \text{incremental capital-output ratio or ICOR} = dK_g/dY$$

$$K = \text{capital stock in economy}$$

$$I = dK_g = \text{gross investment}$$

$$gY = (I/Y)/k$$

Thus: growth depends upon investment rate (I/Y) and ICOR (k).
 ICOR is a long-run measure of overall efficiency of economy (or how much investment is required to create increase in GDP).

Ranges of k and I/Y ?

Fiscal policy can affect k and I/Y . Need to focus on I .

9

Investment (% GDP), ICOR and Growth Rates

	1970 - 2004			1990 - 2004		
	I/GDP	k	g	I/GDP	k	g
France	20.8%	8.2	2.5%	19.1%	9.7	2.0%
Germany	22.0%	10.1	2.2%	21.1%	12.3	1.7%
United Kingdom	18.2%	7.8	2.3%	16.9%	7.1	2.4%
United States	18.7%	5.9	3.2%	18.0%	5.9	3.1%
Brazil	20.5%	5.2	3.9%	19.5%	7.7	2.5%
India	19.9%	4.0	4.9%	22.4%	3.9	5.7%
China	30.2%	3.5	8.7%	33.1%	3.3	10.1%
Botswana	29.5%	3.0	9.7%	26.6%	5.1	5.2%
Lesotho	37.0%	6.7	5.5%	52.3%	15.8	3.3%
Pakistan	16.2%	3.3	4.9%	16.6%	4.2	4.0%
Bolivia	16.0%	6.2	2.6%	16.1%	4.7	3.4%
Ghana	14.1%	5.5	2.6%	21.3%	4.7	4.5%
Kenya	18.6%	4.2	4.4%	17.3%	8.0	2.2%
Malawi	16.6%	4.4	3.8%	13.7%	4.3	3.2%
Tanzania				19.9%	5.0	4.0%
Uganda				17.2%	2.7	6.5%
Uzbekistan				27.2%	21.6	1.3%

China 1997-2006		
I/Y	k	g
39.4	4.3	8.2

10

Factors affecting ICOR include:

- Capital intensity of economy
- Mix of investments
 - Government, state owned enterprises, private: allocation and implementation/technical efficiency
 - Gestation or payback period
- Social capital: transaction costs of doing business arising out of informal/formal legal and regulatory systems
 - Security
 - Contracts
 - Financial infrastructure/regulation
- Cost of capital
 - Political institutions and governance
 - Economic and financial management

11

HARROD DOMAR GROWTH MODEL

ΔK = Change in Capital Stock (Net Investment)

ΔY = Change in GDP

$\text{ICOR} = \Delta K / \Delta Y$ (by definition)

or $\Delta Y = \Delta K / \text{ICOR}$

or $\Delta Y/Y = \Delta K / Y / \text{ICOR}$

or $gY = I/Y / \text{ICOR}$ (Harrod Domar Equation)

ICOR therefore measures the efficiency of the productive process in a country. It defines how many units of capital are needed to increase national income by 1 unit?

Practical Example

Harrod-Domar Equation: $gY = \frac{I/Y}{ICOR}$

IF:

Investment rate = 15%

ICOR = 3

Then $gY = 15\%/3 = 5\%$ (growth rate)

Key is to improve **savings rate** and **ICOR**
(investment productivity)

13

Savings Rates

I = private investment (including State Owned Enterprises) (I_p) + government investment (I_g)

This is financed by gross national savings + foreign savings

S = S_p Private savings by persons and corporations
(depreciation and retained earnings)

+ S_g Government savings

+ S_f Foreign savings

I = S (Total Savings) = $S_p + S_g + S_f$,

14

Savings with Taxation and Government Expenditures

Assume foreign savings are 0 (that is $IM-X = 0$)

t = average tax rate

a = G/Y (ratio of government expenditure to GNP)

s = marginal propensity to save or the personal savings rate

Thus, $S_{private} = s(Y-T)$

See Manual Equation 2.7

$S_{government} = tY - aY$

$$gY = \frac{s(1-t) + t - a}{ICOR}$$

$$gY = \frac{t(1-s) + s - a}{ICOR}$$

Example with Taxes and Government Expenditures

If $s=20\%$, $a=15\%$, $t=15\%$, ICOR 4

$$gY = \frac{0.15(1-.2) + 0.2 - 0.15}{4} = 4.25\%$$

IF: tax rate goes up to 20%, then

$$gY = \frac{0.20(1-.2) + 0.2 - 0.15}{4} = 5.25\%$$

16

Some Other Examples

If country wants a growth rate of 6%, what should the tax rates need to be? (**23.75%**)

If ICOR goes higher, then what will happen to growth rate? (*If ICOR is 6, then $gY = 2.8\%$, if 2, then $gY = 8.5\%$*)

If ICOR goes higher and if government wants to maintain the previous growth rate, would the government need to increase or decrease the tax rate? (*Increase; eg, if ICOR was 6, and want gY to be 4.25%, the tax rate 25.6%*)

17

What if Government Expenditure Ratio goes Up?

If Government revenues increase, there may be propensity for government to spend an increasing proportion of the revenues?

Definition: $G = vT$

where v is the incremental proportion which government will spend from the taxes.

Please Effect (Stanley Please, "Savings through Taxation: Reality or Mirage?" *Finance and Development*, 4, #1 (March 1967), 24-32.

More Complete Growth Formula

$$I = S + T - G + IM - X$$

$$I = s(Y-T) + (T-G) + (IM-X)$$

$$\text{Assume } (IM-X) = 0$$

$$I = s(Y-tY) + (tY-vtY)$$

$$I = sY(1-t) + Y(t-vt)$$

$$I/Y = s(1-t) + t(1-v)$$

$$\text{Then Growth Rate} = gY = \frac{s(1-t) + t(1-v)}{ICOR}$$

19

Example with Adjusted Formula

If $s=20\%$, $a=15\%$, $t=15\%$, $v=0.9$, $ICOR = 4$

Assume $(IM-X) = 0$

$$\text{Then Growth Rate} = gY = \frac{.2(1-.15) + .15(1-.9)}{ICOR}$$

$$gY = 4.625$$

If $t=.20$, then $gY = 4.50\%$ gY declines

20

PRINCIPLES OF TAXATION

Prof. Roy Kelly
Sanford School of Public Policy, Duke University
(roykelly@duke.edu)

Azerbaijan State Economics University (ASEU)
Spring 2010

1

PRINCIPLES OF TAXATION: Criteria for "good" tax

RAISE REVENUES (buoyancy and stability)

Subject to:

- **Economic Efficiency:** (Distortions & Social Welfare Costs)
- **Equity** (benefit and ability to pay principles)
- **Administrative Feasibility** (Compliance & Admin. costs)
- **Political Acceptability** (Stakeholder Analysis)

2

REVENUE POTENTIAL

RESPONSIVENESS

- Income
- Costs of Services
- Inflation
- Population

STABILITY

- Diversity in revenue sources
- Tax base definitions
- Tax rate structure

ISSUE OF REVENUE NEUTRALITY

3

REVENUE POTENTIAL (2)

- The **overall tax revenue structure** of an economy should produce **stable revenue flows** so that fiscal deficits are predictable in order to
 - avoid inflationary effects and/or "crowding out" effects on private investment from domestic debt financing and/or
 - the need to resort to foreign debt obligations of excessive debt financing demands

Difficult to implement RAPID cuts in public expenditures or change tax laws or upgrade administrative capacity in response to a revenue crisis. Overall tax structure should be designed to **avoid revenue crises**.

4

REVENUE POTENTIAL (3)

REVENUE STABILITY has two components

- **REVENUE ELASTICITY:** Revenues should grow at least as fast as GDP to avoid incremental new taxes and/or administrative measures to keep revenues at a constant share of GDP. Ensure (i) a revenue base that grows with the economy and (ii) tax rates that capture at least a constant share of the growing base.

Ad valorem tax rates (rates that tax a share of the value of a tax base) on a broad base are generally required to ensure revenue elasticity.

- **REVENUE DIVERSIFICATION:** Tax or revenue structure should be diversified to withstand shocks such as fluctuations in world commodity prices. Revenue diversification is hard to achieve in small economies which depend heavily on particular sectors or revenue sources.

5

ECONOMIC EFFICIENCY

MINIMIZE ECONOMIC DISTORTIONS

- INVESTMENT
- PRODUCTION
- CONSUMPTION
- SPATIAL DISTRIBUTION

MAINTAIN NEUTRALITY

REDUCE SOCIAL WELFARE COSTS

6

ECONOMIC EFFICIENCY (2)

- Transfer of resources (or removal of market surplus) to public sector, called **tax burden**, always involves an **added cost to the economy or excess burden or added loss of surplus** that arises out of distortions in price system caused by taxes.
- Taxes not only reduce the size of the private sector, but also **change prices (wage rates, interest rates, goods prices, etc) in the economy** which results in changes in **PATTERNS** of consumption, savings, work effort, investment and international trade compared to the pattern that would have prevailed without taxes.
- Changes in patterns or **ALLOCATION** of economic resources causes an added cost on the economy.

7

ECONOMIC EFFICIENCY (3)

- Tax structures should be designed to collect a given tax amount with minimum excess burden or economic efficiency cost.
- Generally high efficiency costs are related to high tax rates and to large differentials in tax rates:
 - The efficiency costs of taxes rise more than proportionately with the tax rate.
 - Large tax rate differentials between similar economic activities cause large efficiency costs.

8

ECONOMIC EFFICIENCY (4)

- This principle encourages tax reforms which focus on:
 - **Reducing tax rates**
 - **Standardizing tax rates (more uniform)**
 - **Broadening the tax base**

Broad tax base coverage is consistent with principle of horizontal equity.

9

EQUITY

BENEFIT PRINCIPLE OF TAXATION

- PAYMENT RELATED TO BENEFITS

ABILITY TO PAY PRINCIPLE OF TAXATION

- PAYMENT RELATED TO ABILITY TO PAY

OPTIONS

- PROPORTIONAL
- PROGRESSIVE
- REGRESSIVE

10

EQUITY (2)

- **HORIZONTAL EQUITY**
 - Equals should be paying equal taxes.
 - Demands broad coverage by a tax base
 - Tax law detail and complexity comes from need to define a comprehensive tax base and deal with all the exceptional circumstances and cases

11

EQUITY (3)

- **VERTICAL EQUITY**
 - Demands that a **larger tax burden** is placed on individuals with a **greater capacity to pay** in order to "improve" the social income distribution. Society-wide social judgments depend upon and arise out of the political process.
 - "**Ability-to-pay**" principle -- those with a higher ability to pay should bear a larger burden of tax.
 - "Ability to pay" often equated with **income**.

12

EQUITY (4)

• VERTICAL EQUITY

- "Larger burden" often interpreted as a *larger share of overall tax burden*.
- A *progressive tax structure* has *higher income persons paying a higher share (higher percentage) of their income in tax*.

13

ADMINISTRATIVE FEASIBILITY

MINIMIZE ADMINISTRATIVE COSTS

MINIMIZE COMPLIANCE COSTS

TAX ADMINISTRATION IS TAX POLICY

14

ADMINISTRATIVE FEASIBILITY (2)

- Need to reduce administrative or transaction costs of transferring resources from private to public sector to leave the maximum resources for producing public sector and private sector goods and services.

Two components:

- "**compliance cost**" which usually refers to the costs of the private sector in complying with the tax laws, and
- "**tax administration cost**" which usually refers to the public sector costs of administering the tax laws.

15

ADMINISTRATIVE FEASIBILITY (3)

- **Tax handles** are tax opportunities with low transactions costs – eg, customs collection at port
- Excessive public spending on tax administration can be wasteful, but spending too little can also be economically wasteful for at least two reasons
 - To gain **broad coverage** of a tax base requires sufficient **enforcement capacity**. Broad coverage is more equitable and allows collection of tax revenues at lower, more efficient tax rates.
 - Added administrative spending that **educates the taxpayer and services their tax-paying needs** can lower the economic transaction costs of complying with the tax.

This implies there is some "optimal level" of spending on tax administration

16

TOTAL ECONOMIC COST OF TAXES

- Initially focus in design of taxes was on administrative feasibility and costs
- High tax rates of early post WWII plus development of applied economic concepts of allocative efficiency costs of taxes changed focus to reducing allocative efficiency costs of taxes
- Now: Focus on how to reduce combined transactions (technical efficiency) costs *plus* allocative efficiency costs of taxes

17

POLITICAL ACCEPTABILITY

PRIME MINISTER / GOVERNOR

LEGISLATURE (PARLIAMENT / COUNCIL)

JUDICIARY

TAXPAYERS

- BUSINESS
- INDIVIDUALS
- NON-PROFIT ORGANIZATIONS

OTHER STAKEHOLDERS

18

Economic Efficiency and Incidence of Taxation

Prof. Roy Kelly
Sanford School of Public Policy, Duke University
(roykelly@duke.edu)

Azerbaijan State Economics University (ASEU)
Spring 2010

1

THREE BASIC POSTULATES OF APPLIED WELFARE ECONOMICS

- The competitive demand price for a given unit of an item measure the value of that unit to the demander (i.e., Willingness to pay)
- The competitive supply price for a given unit of a good or service measures the value of that unit to the supplier
- When evaluating the net benefits or costs of a given action (project, program, or policy), the costs and benefits accruing to each member of the relevant group (e.g., a nation) should wherever possible be measured and identified with the recipient, but in the economic appraisal should normally be added without regard to the individuals to whom they accrue.

Harberger, "Three Postulates"

ELASTICITIES OF DEMAND AND SUPPLY

- Economists commonly measure responsiveness using the concept of elasticity.
- **Elasticity** is a general concept that can be used to quantify the response in one variable when another variable changes.

Elasticity = Responsiveness

PRICE ELASTICITY OF DEMAND

The price elasticity of demand is defined as

$$\eta = \% \text{ change in quantity demanded} / \% \text{ change in } P^d$$

- Suppose the price of oranges rises 10 percent. Then:
 - if Q^d falls 20 %, $n = -2$; demand is elastic.
 - if Q^d falls 10 %, $n = -1$; demand is unit elastic.
 - if Q^d falls 3 %, $n = -0.3$; demand is inelastic.
- Demand for a goods is more elastic if:
 - There are good substitutes
 - It constitutes a large share of a typical consumer's budget.
- Good substitutes are easier to find in the long-run, so the long-run demand elasticity is usually larger than the short-run elasticity.
- Narrowly defined goods (e.g., Oranges) tend to have better substitutes than widely defined goods (e.g., Fruit), and hence have more elastic demand.

PRICE ELASTICITY OF SUPPLY

The price elasticity of supply - a measure of the response of quantity of a good supplied to a change in price of that good. Likely to be positive in output markets.

It is defined as:

$$\epsilon = \% \text{ change in } Q^s / \% \text{ change in } P^s$$

- The long-run price elasticity of supply can be quite high.
- If the supply curve is horizontal (a "constant cost" industry) then ϵ is infinite.

OTHER COMMON ELASTICITIES

Cross Price Elasticity of Demand

A useful measure is the cross elasticity of demand, defined as

$$\epsilon_{ij} = \% \text{ change in demand for } i / \% \text{ change in price of } j$$

- Substitutes
- Complements

Income Elasticity of Demand

Measures how demand will change as income increases? (responsiveness with respect to changes in GDP per capita)

FUNDAMENTALS OF TAXATION

- Willingness to pay principle
- Concept of consumer surplus
- Concept of producer surplus

Distortionary effects of taxes

Supply price - the price received by producer/seller;

Demand price - the price paid by the consumer/buyer

APPLICATION TO EXCISE TAXATION

- Indirect tax and the wedge between supply and demand price

– Ad valorem tax $P^d = (1 + t) P^s$

– Specific tax $P^d = P^s + T$

Incidence, Excess Burden, and Tax Revenue

- **Tax incidence:** is the share of tax burden that producers and consumers bear.
- **Excess Burden:** also known as efficiency loss or deadweight loss, measures the economic inefficiency or loss in productive resources created by the tax.
- **Tax Revenue:** Tax revenue is the amount of tax received by the government.

1. TAX INCIDENCE

Proportion of tax borne by consumers is given by

$$\text{CHANGE IN } P^d = \frac{\epsilon}{\epsilon - \eta} = \frac{1}{(1 - (\eta / \epsilon))}$$

Thus,

- The incidence of the tax depends only on the relative size of demand and supply elasticities
- As demand becomes more elastic (i.e. η^d rises absolutely) consumers bear less of the burden, as they “run away” from the tax.

Implication for taxes on trade: since the supply curve for imports is perfectly elastic, it follows that consumers bear the entire burden of import tariffs.

2. EXCESS BURDEN

The expression for excess burden (EB) for a specific tax is as follows:

$$EB = - 1/2 T^2 Q_0 / P_0 ((\epsilon * \eta) / (\epsilon - \eta))$$

And as for an ad valorem tax, EB is:

$$EB = - 1/2 t^2 Q_0 P_0 (\epsilon * \eta) / ((\epsilon - \eta) (1-t))$$

Principle 1. EB rises with the square of the tax rate.

Implications:

- A low tax rate on a broad base will be less inefficient than a high tax rate on a low base.

Principle 2: EB rises with elasticity and demand and elasticity of supply.

Implications:

- Where a good has excellent substitutes then elasticity of demand will be high;
- Such goods should not be taxed heavily, unless the substitutes are taxed heavily too.
- Revenue will be easiest to collect for goods whose demand and supply is price inelastic; this includes alcohol and tobacco.

3. Total Tax Revenue

With some algebraic manipulations, we get the following formula for total tax revenue (TTR).

$$TTR = TQ_0(1 + T/P_0 * (\epsilon * \eta / (\epsilon - \eta)))$$

If the tax is ad valorem rather than specific then this equation becomes:

$$TTR = tP_0Q_0 + t^2Q_0P_0 * (\eta * (1 + \epsilon) / (\epsilon - \eta(1 + t)))$$

Some conclusions from the above-mentioned equations:

Principle 3: Total Tax Revenue rises with t initially, but eventually falls; it is lower if ϵ and η are higher.

Implications:

- Higher tax rates can yield less tax revenue;
- This is especially likely if supply and demand are price elastic.

Principle 4: Change in EB/change in R can be quite large, and rises with t , ϵ and η .

This follows from the first 3 principles.

Implications:

- Raising revenue through higher tax rates frequently carries very high efficiency costs, per extra unit of revenue raised.

Applications to More than One Market

It is not sufficient to look at a single market in isolation. There are typically other goods and services which are close substitutes.

Examples include:

- A. Cars and pickups; small and medium-sized cars; beer and wine.
- B. Formal-sector and informal-sector provision (e.g., Car repair).
- C. Smuggled goods v. Dutiable imports (e.g., Clothing, tvs, vcrrs, mineral water).
- D. Exempt goods v. Dutiable goods (e.g., Large cars).

When good substitute exist - the elasticity of demand is high. In such situations imposing a tax will cause a good deal of the tax base to evaporate, so the revenue will be relatively disappointing, and the efficiency cost will be high.

Implication: Close substitutes should be taxed at about the same rate.

REVENUE GROWTH AND STABILITY: TAX CAPACITY AND TAX EFFORT

Prof. Roy Kelly
Sanford School of Public Policy, Duke University
(roykelly@duke.edu)

Azerbaijan State Economics University (ASEU)
Spring 2010

1

Overview

- Tax capacity
- Tax effort
- Selective taxes versus broad-based taxes
- Tax buoyancy and tax elasticity
- Forecasting tax revenues

Tax Capacity

- **Size of government** in a country is a political choice, but this choice is **constrained by the structural characteristics of the economy** that affect the feasibility and costs of collecting taxes.
- The cost-effectiveness of tax administration is affected by the availability or absence of “**tax handles**” in an economy.

Tax Capacity (contd)

- **Tax handles** – structural features of economy that make tax collection feasible and lower costs of collection
 - High share of trade in GDP and concentration of trade in sea, rail and airports
 - Small agricultural sector (small subsistence and small scale farming sectors) or large corporate cash-crop farm sector
 - Large mining/mineral sector
 - Large tourism sector
 - Large corporate sector
 - Small informal sector
 - Established accounting profession
 - Well developed information technology sector
 - High per capita income
 - High level of literacy, education and human capital

Tax Capacity (contd)

- Effect of tax handles on tax revenue yield can be estimated across countries to the extent that measures of tax handles are available
- For example: Y is GDP and other variables are measures of sector values

per capita income	Y_p	positive
exports (manufacturing)	X / Y	positive
extractive (mineral) industries	E / Y	positive
agriculture	A / Y	negative
tourism	Γ / Y	positive
- Using data from less developed countries, a regression equation was estimated of tax capacity (IMF 1972-76):

$$T/Y = \text{constant} + a*Y_p + b*X/Y + c*E/Y + d*A/Y + e*\Gamma/Y$$

Generally all coefficients are significant and positive except d.

Tax Capacity (contd)

- Estimated (T/Y) is the tax capacity or “average” tax yield of a country with its specific structural characteristics (tax handles), i.e. when we plug in values of different parameters for the economy, it tells us what tax ratio to GDP (T/Y) is feasible.

Alternative Way of Estimating Tax Capacity

- As the IMF regression equations are not quite current, an alternative would be to look at similar economies among neighboring countries and compare tax handles and tax collections under different tax instruments.

Tax Effort

- **Tax effort or international tax comparison** is the actual tax yield of a country relative to the tax capacity of the country.
- **Tax effort** = (Actual T/Y)/(Tax capacity T/Y)
- If tax effort > (or <) 1, then country is collecting more (or less) than the average tax yield for countries with similar characteristics

A tax effort close to or greater than 1 is good. If it is very much lower than 1, there is scope for improvement.

- Tax effort is affected by both tax structure (tax rates, bases, etc) and tax administration and compliance. Tax effort can be increased by increasing tax rates, expanding tax bases, improving tax enforcement and compliance, etc.

Measures of Tax Collection Efficiency

- How much of the potential or legislated tax base is being effectively collected?
- Rough measure relative to GDP:
 - Effective base = Actual collections/tax rate
 - GDP Efficiency = Effective base/GDP
- Precise efficiency measure relative to best estimate of potential base from national statistics:
 - Efficiency = Effective base/Best estimate of base
- Example: If a 10% broad-based sales tax collects revenues equal to 4% of GDP
 - GDP efficiency = 40%
 - If best estimate of potential base = 60% of GDP; then Tax collection efficiency = 40%/60% = 67%

Selective versus broad-based taxes

- Few or weak tax handles lead countries to using selective taxes targeted at available tax handles
- “Nuisance taxes” are selective taxes which collect low revenues and have high costs of collection and compliance – these should be discontinued.
- As tax handles improve, broad-based taxes become possible
- Industrial countries tax systems evolved from narrow selective to broad-based general taxes

Revenue Growth and Stability

- An important **goal** of the tax system is to ensure that revenues grow at same or higher rate than the economy or GDP
- Basic **characterization** of a tax system as a whole or a particular tax is the growth rate of revenues as the economy grows.
- Two measures of Tax System Responsiveness:
 - **BUOYANCY**
 - **ELASTICITY**

TAX BOUYANCY

- Measures actual or observed growth in revenues (T) relative to actual growth in GDP (Y) from year to year

$$\begin{aligned} \text{– Tax Buoyancy} &= \% \Delta T / \% \Delta Y \\ &= \% \Delta(\text{tax base} \times \text{rate}) / \% \Delta Y \\ &= [\% \Delta(\text{tax base} \times \text{rate}) / \% \Delta(\text{tax base})] * [\% \Delta(\text{tax base}) / \% \Delta Y] \end{aligned}$$

Growth in tax revenues arises from growth in tax base *and* from changes in effective tax rates

TAX ELASTICITY

- Measures growth in **tax revenues without any discretionary changes in tax structure** (Adjusted Tax AT) relative to growth in GDP (Y) from year-to-year. It is the ratio of percentage change in tax revenue, without any discretionary changes in tax rate or tax base, to the percentage change in GDP.

$$\text{Tax Elasticity} = \% \Delta AT / \% \Delta Y$$

where % Δ AT is percentage change in tax revenue (adjusted tax revenue) if no discretionary changes are made in tax rate or tax base, and % Δ Y is percentage change in GDP.

A low tax elasticity implies that tax revenue will not increase as income or GDP increases. It means that tax system will need frequent changes and tax system needs to be carefully redesigned. *Is there a problem with that happening?*

Elasticity and Buoyancy Estimates

Revenue Source	Elasticity	Buoyancy
Import Duties	0.901	1.456
Turnover Taxes	0.897	1.641
Excise Duties	0.168	0.657
Corporate Income Taxes	0.909	1.046
Personal Income Taxes	1.194	1.115
Overall Tax Revenues	0.740	0.915

Source: Case of Sri Lanka, Jayawardena, et al, 1990

Discussion:

1. What is overall responsiveness of taxes?
2. How much will revenues grow for each 1% increase in GDP?
3. Why is overall buoyancy higher than overall elasticity?
4. Why is elasticity for excises so low, compared to buoyancy?
5. What is most elastic tax? Why? Why is buoyancy less?

Tax Elasticity (contd)

- Tax elasticity is a basic requirement in **revenue forecasting**

- Next year's revenues (T_1) are

$$T_1 = T_0 + \Delta T$$

$$\Delta T = (\text{Tax elasticity}) * \% \Delta Y * T_0 + DR_1$$

where $\% \Delta Y$ is the projected growth rate of GDP

MAKING TAX SYSTEM ELASTIC

- Cover growing sectors of economy in tax base.
- Cover comprehensive tax base
- Use progressive tax rates
- Include commodities with higher income elasticity of demand
- Use ad valorem rather than unit tax rates (index unit rates)
- Minimize collection lags (PAYE)
- Be Broad Based and Simple

Example for Buoyancy and Elasticity

Date	2005	2009
GDP Million	42,679	86,457
GDP Inflation	1.016	1.7
Income Taxes	3,633	5,200
Trade Taxes	2,060	4,000
Total Taxes	8,500	14,500

Questions:

1. Calculate buoyancy for income, trade and total taxes
2. What is the tax elasticity of these taxes?
3. What can be inferred from the buoyancy calculations?
4. If elasticity is higher than buoyancy, what is implication?

Tax Buoyancy Calculations for Taxland

	2005	2009
1 Nominal GDP	42,679	86,457
2 GDP Deflator	1.016	1.7
3 Real GDP (1/2)	42,007	50,857
4 % change in GDP		21%
5 Nominal Income Tax	3,633	5,200
6 Real Income Tax (5/2)	3,576	3,059
7 % change in Inc Tax		-14%
8 Buoyancy for Income Tax (7/4)		-0.68
9 Nominal Trade Taxes	2,060	4,000
10 Real Trade Taxes (9/2)	2,028	2,353
11 % change in Real Trade Taxes		16%
12 Buoyancy for Real Trade Taxes (11/4)		0.76
13 Nominal Total Taxes	8,500	14,500
14 Real Total Taxes	8,366	8,529
15 % Change in Total Taxes		1.95%
16 Total Buoyancy (15/4)		0.09

USER CHARGES AND NON-TAX REVENUES

Dr. Roy Kelly
(roykelly@duke.edu)

Program on Fiscal Decentralization and Local Government
Financial Management
Duke University
7 July – 25 July 2008

1

Why Public Sector Service Provision? Public (Social) Goods and Externalities

- **Public Goods:**
 - Two characteristics – Non-exclusion and non-rivalness.
 - Examples: security, pollution free air.
- **Semi-public goods** when only one of the criteria fulfilled. - Examples: bridge, park.

Externality: When costs or benefits accrue to people other than suppliers and consumers of the good/service.

Many services provided by local and state governments (drinking water, transport, primary education, basic health service) have positive externalities. Many show characteristics of a public good (local police, street lighting, fire protection).

2

What are User Charges? (1)

User Charges: Prices charged by state/local governments for specific services, used to pay all or part of the cost of providing those services (**benefit principle of taxation**)

- Different from financing services through general taxes with no direct link between tax payment and services rendered.
- Examples - water charges, highway tolls, electricity tariffs, public transport fares, tuition fees, public hospital charges.

Tax vs User Charge?

The primary distinction is that a tax is "coerced" from individuals for the benefit of all, while a non-tax revenue (in this case, a user charge) may be a charge on an individual for the benefits received or costs imposed by that individual.

3

What are User Charges? (2)

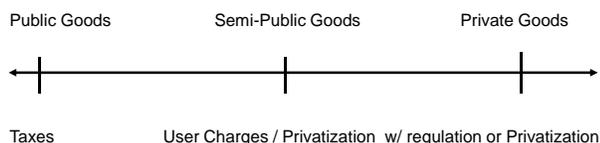
Dual Role of User Charges:

- (1) **Encourages Efficient Use of Resource/Service:**
Consumers face true costs of consumption, thereby creating an incentive for efficient use and minimizing waste
- (2) **Generates Revenues to Finance** the production and operation/maintenance of facilities.

Paying a user charge for public services is similar in concept to paying a market price for services provided by the private sector.

4

Continuum from Public Goods to Private Goods



5

When to use "User Charges"

'USER CHARGES' should be used for goods with the following characteristics:

1. **Attributable:** Beneficiaries Can Be Identified
2. **Divisible:** Non-payers Can Be Excluded
3. **Measurable:** Benefits Can Be Quantified

Other Factors to Consider:

- If not concerned with universal access (Equity)
- If able to administer in a cost effective manner

6

Justification for “User Charges”

Equity: “benefit principle” thus, people who consume a service should pay for the service while those who do not use should not pay.

Efficiency:

- Allows government to ration demand, allocating services to those who value most (“willingness to pay”)
- Provides incentives to avoid waste / allocate scarce resources (eg, lawn watering,)
- Provides signals to producers to know when to increase capacity/services

Revenues: Produces revenues, allows increase in services

Administrative Feasibility: Relatively easy to collect since you can exclude.

Politically: Not a tax, but also not tax deductible in many tax systems

7

Reasons against “User Charges”

Pure Public Goods: Impossible because of non-excludability

Administrative Feasibility:

- hard or expensive to exclude (meters on water supply, toll roads, etc.); thus can increase cost of providing service
- Must be able to identify the user

Externalities: if spillovers, there is an under-consumption or over-consumption of the service if full charge is used. Thus, you may need to undercharge to encourage more consumption in case of under-consumption.

Equity: Poor cannot afford to pay for basic services, thus user charges will exclude

Must understand the ‘cost structure’ to set the fees appropriately to maximize efficiency.

8

Some Applications for User Fees

- *Water Supply*
- *Sewerage*
- *Housing*
- *Markets / Abattoirs*
- *Education*
- *Medical Services*
- *Street Lighting*
- *Solid Waste*
- *Public Transit*
- *Land Development*
- *Telecommunications*
- *Electricity*
- *Others??*

9

Practice in OECD Countries (2001)

• **Water and Sewerage charges**

- 60% cost recovery in Japan through user charges
- 75% in Sweden
- Canada: 85% for water supply and 56% for sewerage
- Almost 100% in France
- Virtually nothing in UK
- Partial recovery in the US, now a move towards full cost recovery

• **Transport**

- Almost all countries charge fares for services provided but usually below full cost level (USA 29%, Sweden 42% and Germany 62%)

User charges increasingly being used in all countries. Why?

10

Why Trend Towards User Charges?

1. **To promote fairness** by shifting the costs of particular programs/activities from taxpayers at large to those specific users who benefit most directly from them.
2. **To promote a more efficient allocation of resources** by introducing a market-type discipline on the demand for and the supply of goods and services, scarce natural resources and the environment.

11

User Charges in Municipal Governments (USA)

Revenue source	Service and utility charges as a percentage of general revenues		
	1991-92	1996-97	2001-02
Property taxes	25.1	22.7	22.8
All other taxes	3.4	3.7	4.4
Service charges	18.7	20.9	20.4
Utility charges	22.1	21.4	21.9
Other non taxes	<u>11.9</u>	<u>11.1</u>	<u>11.1</u>
	100.1	100.0	100.0
Total general revenue (in millions) ^a	\$161,293	\$202,674	\$255,220

^aIncludes utility charges but excludes intergovernmental aid, liquor store income, and insurance trust revenue.

Source: Robert Bland, a Revenue Guide for Local Government, (Washington DC: ICMA, 2005)

12

User Charges in County Governments (USA)

Revenue source	Service and utility charges as a percentage of general revenues		
	1991-92	1996-97	2001-02
Property taxes	43.5	38.6	38.4
All other taxes	15.0	17.0	17.1
Service charges	25.6	29.1	29.1
Utility charges	1.8	2.2	2.1
Other non taxes	<u>14.1</u>	<u>13.1</u>	<u>13.2</u>
	100.1	100.0	100.0
Total general revenue (in millions) ^a	\$94,808	\$122,161	\$161,483

^aIncludes utility charges but excludes intergovernmental aid, liquor store income, and insurance trust revenue.

Source: Robert Bland, a Revenue Guide for Local Government, (Washington DC: ICMA, 2005)

13

Town of Cary (NC) User Charge Policy

User Fees

"The Town sets fees that will maximize user charges in lieu of Ad Valorem Taxes for services that can be individually identified and where the costs are directly related to the level of service. This objective is in keeping with the Council's goal that growth should pay for itself and not place a burden on current residents who do not use the service.

Emphasis of user charges over Ad Valorem Taxes results in the following benefits:

- User charges are **paid by all users**, including those exempt from property taxes.
- User charges **avoid subsidization** in instances where the service is not being provided to the general public.
- User charges are a means of **rationing the provision** of certain services.
- User charges for certain services can be justified on the basis of **equity and efficiency, by producing information on the demand level** for services and by helping to make the connection between the amount paid and the service received."

<http://www.townofcary.org/depts/budget/fy2007/approved/00b/124-townfinancialpolicy-1gchudandact.pdf>

14

Percentage Distribution of Financing of Local Public Expenditures in Selected Cities by type of Revenues

Table 2.10: Percentage Distribution of Financing of Local Public Expenditures in Selected Cities by Type of Revenues

City, year	Total	From local taxes			From non-local taxes		
		Local taxes	State	Federal	Grants	Other	Net
Atlanta, Georgia, 1981	131.0	48.0	1.0	1.0	1.0	1.0	48.0
Los Angeles, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San Francisco, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San Jose, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San Diego, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San Antonio, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San Houston, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San Dallas, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San Phoenix, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San Portland, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San Denver, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San Chicago, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San New York, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San Washington, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San Boston, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San Philadelphia, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San Francisco, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San Jose, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San Diego, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San Antonio, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San Houston, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San Dallas, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San Phoenix, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San Portland, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San Denver, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San Chicago, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San New York, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San Washington, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San Boston, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San Philadelphia, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San Francisco, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San Jose, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San Diego, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San Antonio, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San Houston, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San Dallas, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San Phoenix, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San Portland, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San Denver, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San Chicago, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San New York, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San Washington, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San Boston, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San Philadelphia, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San Francisco, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San Jose, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San Diego, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San Antonio, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San Houston, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San Dallas, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San Phoenix, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San Portland, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San Denver, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San Chicago, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San New York, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San Washington, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San Boston, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San Philadelphia, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San San Francisco, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San San Jose, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San San Diego, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San San Antonio, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San San Houston, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San San Dallas, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San San Phoenix, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San San Portland, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San San Denver, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San San Chicago, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San San New York, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San San Washington, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San San Boston, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San San Philadelphia, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San San San Francisco, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San San San Jose, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San San San Diego, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San San San Antonio, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San San San Houston, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San San San Dallas, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San San San Phoenix, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San San San Portland, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San San San Denver, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San San San Chicago, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San San San New York, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San San San Washington, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San San San Boston, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San San San Philadelphia, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San San San San Francisco, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San San San San Jose, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San San San San Diego, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San San San San Antonio, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San San San San Houston, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San San San San Dallas, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San San San San Phoenix, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San San San San Portland, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San San San San Denver, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San San San San Chicago, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San San San San New York, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San San San San Washington, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San San San San Boston, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San San San San Philadelphia, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San San San San San Francisco, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San San San San San Jose, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San San San San San Diego, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San San San San San Antonio, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San San San San San Houston, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San San San San San Dallas, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San San San San San Phoenix, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San San San San San Portland, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San San San San San Denver, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San San San San San Chicago, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San San San San San New York, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San San San San San Washington, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San San San San San Boston, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San San San San San Philadelphia, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San San San San San San Francisco, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San San San San San San Jose, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San San San San San San Diego, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0
San San San San San San San San San Antonio, 1981	100.0	55.0	1.0	1.0	1.0	1.0	59.0

General Principles of Efficient User Charges

5. Marginal benefits (not total benefits) matter for determining user charges. MB greater than Q1 only accrue to direct users; thus direct users should pay total marginal costs for those amounts.

Distinguish between capital costs (long run production decision) and the operating costs (short run decision). If short term MC, then costs will rise as demand rises with fixed supply, this will signal need for expansion. After expansion, MC (ie, prices) will fall. Sometimes average cost (although not efficient) provides for more price stability.

19

Marginal Cost Pricing

Some Implication of MC Rule:

- (i) Ignore sunk costs
- (ii) Charge equal prices for equal services - no rising block prices (unless externalities linked to increased consumption)
- (iii) Equity aspect are neglected
- (iv) Need to adjust prices frequently for inflation

Ideally, MC rule applied to each of the different aspects of a service:

- (1) consumption, (2) opportunity to use or connect, and (3) access.
- Example of water supply: (1) MC for consumption is cost of pumping and treating additional water; (2) opportunity to use the service requires a minimum level of investment (development and location charge) even if particular citizens do not use it; (3) access requires additional infrastructure (piping, earthwork) for actual hookup.

20

Exceptions to MC Rule

MC pricing rule need not apply in following cases:

1. If Externality (eg, education--need subsidy or pollution--need higher costs);
2. If Administrative and transaction costs of applying marginal cost pricing too high: cost of measuring and billing for services depend on complexity of the system, compare costs and benefits (eg, meters, etc.);
3. If Capital indivisibility or lumpiness of investment: results in varying short run marginal cost, need for some sort of averaging;
4. If decreasing costs industry: MC below average cost (eg, water)

21

Exceptions and Cost Variations

Cost variations: MC could differ in the following cases:

- Across space (rural vs. urban, one region vs. another, difference in neighborhoods),
- Across time (seasonal, daily peak periods), and
- Consumer classes (residential, commercial).

22

Financing Deficits

If charging MC in case of 'decreasing cost services', then MC is less than AC. If so, firm will lose money if they charge MC.

If deficits then can use:

- (i) **General fund** - If deficit persists after MC pricing and distortions associated with tax raising are absent or minimal (land value tax, though limited capacity)
- (ii) **Multi-part Tariffs:** cost of using a service charged by applying MC rule, any deficits met by levying flat monthly fees or lump sum access charges unrelated to use level (eg, water)
- (iii) **Average-Cost Pricing:** Utility can charge the MC pricing plus an indirect 'tax' for the historical costs. This shifts the 'tax' to users not the general public.

23

Equity and Political Considerations

Equity Concerns:

- User Charges can be regressive, falling heavily on the poor
- Better left for other public policies (tax policy at national level or progressive property taxes)
- Subsidies, however, justified on grounds of "basic needs".

There are several ways to incorporate these equity concerns in the pricing system of user charges.

24

Application of User Fees

Some Applications of User Charges:

- **Water Supply:** One of the main local government responsibilities, even though a separate agency may provide actual services.
- Water use fees/charges. Could use three components of payment (a three part tariff):
 - (i) A lump sum *development charge* related to location and size of connection or some other characteristic of use to cover the marginal cost of distribution;

25

Case of Water Supply

- (ii); A lump sum connection charge (access from the system to building) related to the marginal capital cost of providing the connection assessed on basis of lot size, property value, frontage
- (iii) A periodic payment or water supply charge to cover the marginal cost of consumption, i.e., pumping and treating the additional gallon or liter of water (measured by metering, number of outlets in a structure or number of persons in a household); usually set equal to "average incremental cost" (AIC) for the sake of convenience.

26

User Fees Applied to Other Services

- **Other services:** Sewerage and drainage, education, electricity, telephone services, waste disposal, mass transit or public transportation, housing etc.
- **Sewerage and Drainage:** Sewer charges depend upon the amount and type of sewage disposed and size/location of structure. For residential use sewage flow linked to water consumption, metering used only for industrial disposals.
- **Refuse Collection:** Both costs of collection and disposal depend on the amount and type of refuse. Problem of measurement.

27

Refuse Collection User Charges

- **Options for Charging for Refuse Collection**
 - General Revenue (eg, property tax)
 - Service Charge: flat rate based on property characteristic (number of people)
 - User Charge based on type of service (cost of service)
- Determining the marginal cost of collection:
 - Type of service (location of pickup)
 - Amount collected
 - Frequency of Collection
 - Location of the house relative to the dump site
- Efficiency Gains:
 - Substitution of own labor with garbage collectors (curbside vs back of house)
 - MC of garbage will encourage recycling, but also can encourage littering/....
- Examples: Washington DC: cans; Hershey (PA); twisties on bags; Grand Rapids, Michigan; bags sold by municipality

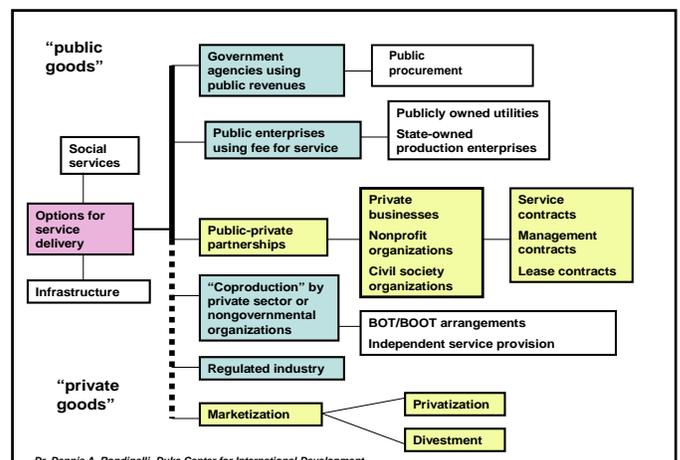
28

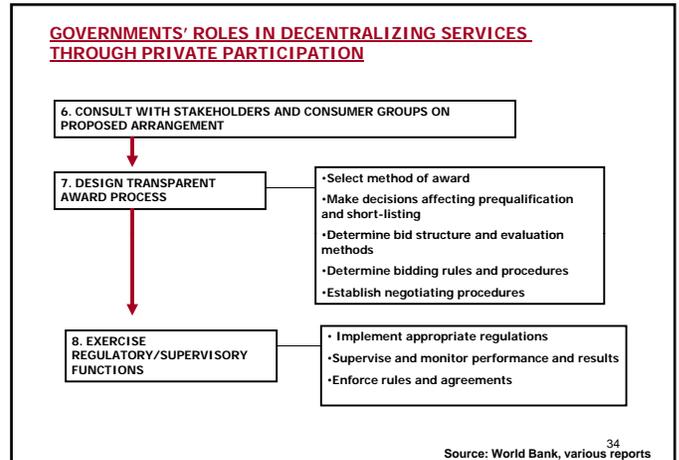
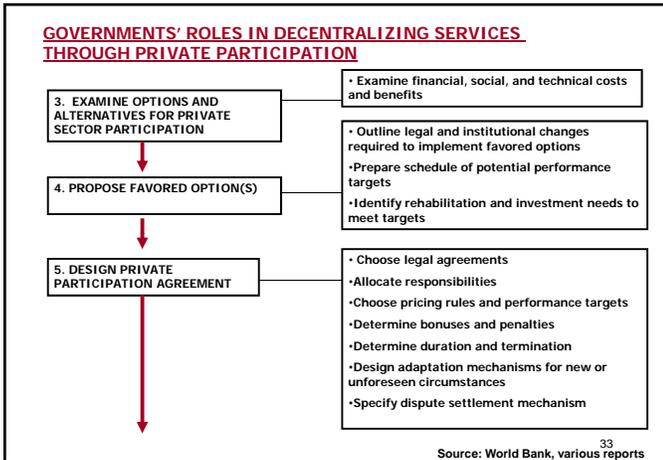
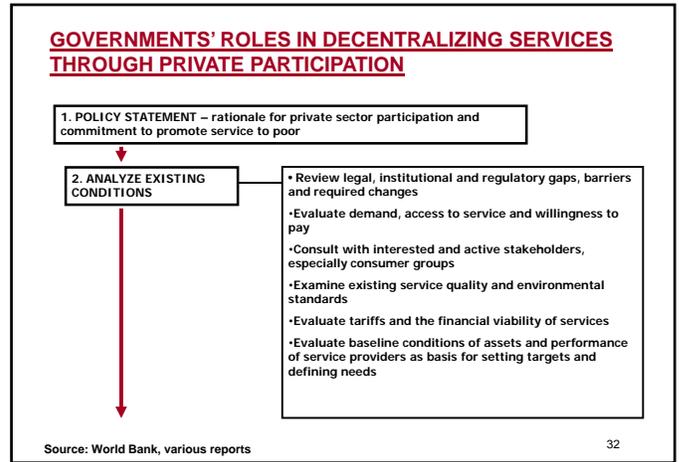
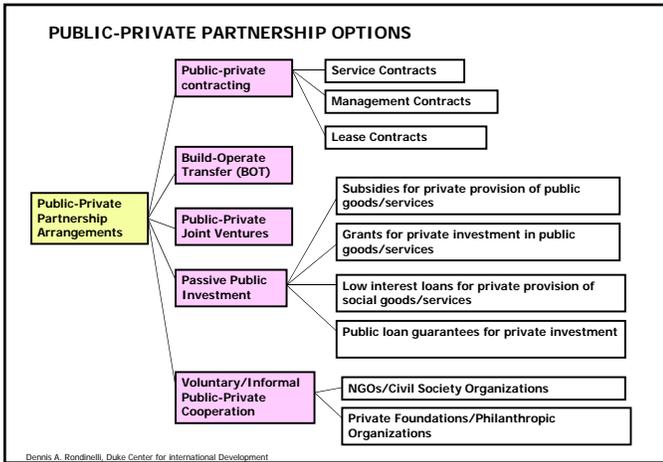
Privatization of Local Services

- Objective: Improve the productivity of government and reduce costs
 - How?
 - "competitive bidding by profit-maximizing firms for a well-specified output guarantees that the product will be produced at the lowest cost. The absence of competition and profit incentives in the public sector is not likely to result in cost minimization."
- [Pack, 1987, p. 527, as quoted in Fisher (2007), p. 160]

Economic competition is more effective than political competition in holding costs down and producing quality services at minimal costs.

29





- ### Three Challenges in Privatization
1. Structuring the Bidding Process
 - Benefits due to competition—not privatization
 - Need potential service suppliers and basic understanding of cost structure
 - Be careful for "low balling" to win contract, with higher prices once government has eliminated its own production system
 2. Specifying the Contract
 - Government services sometimes hard to specify (eg, education?; health?, garbage?, water?)
 3. Monitoring and Enforcing the Contract
 - Specifying and measuring performance
 - Enforcing performance standards / agreements
- 35

- ### Considering Privatization?
- Undertake a cost-of-services study
- Provides rationale for the price to be charged
 - Helps determine whether to contract out or use in-house personnel
 - Identifies cost of providing the service
 - Direct costs: Expenses that would be eliminated if the service were discontinued
 - Indirect costs: Cost of support (or staff) services provided by one department to other departments
- Source: Robert Bland, a Revenue Guide for Local Government, (Washington DC: ICMA, 2005)
- 36

Types of costs

Direct Costs

Personnel:

- Wages
- Benefits

Other:

- Equipment
- Supplies
- Contract services

Indirect Costs

Administrative:

- General government
- Departmental

Other:

- Operating
- Capital

Source: Robert Bland, a Revenue Guide for Local Government, (Washington DC: ICMA, 2005)

37

Issues to Consider:

- Evaluate privatization proposal
 - Specification of service to be provided
 - Cost structure
 - Contractual terms (duration, costs escalation clauses, remedy clauses, etc.)
 - Risks for Non-Performance
- Evaluate cost savings from adopting privatization
 - Focus on marginal costs foregone
 - Evaluate joint costs / cost accounting issues
- Evaluate short and long term costs and benefits, identify ways to reduce performance and contractual risks, mobilize skills requirements for bidding/service specification and monitoring/enforcement of private contract.

38

Case Discussion: Lone Pine Trash Collection

Background

- **Population** 3,700
- **Residential and Commercial Property Owners:** 1,175
- **Local employees** (about 20)
- **Few Services** (local police, fire services, trash collection, small park, swimming pool)
- **Average Prop Taxes** are 525\$/property owner
- **Some Issues:**
 - Lax cost accounting across departments
 - Accounting for depreciation is included
 - Pensions remain unfunded

**FACING A DEFICIT
POLITICALLY: NO TAX INCREASE**

39

Sanitation Division

Privatization Offer:

Trash Management Corporation of Texas (TMCT)

- \$6.75 per household per month

Should Joany Accept the Privatization Offer?

Issues to Consider:

- Impact on Budget Deficit?
- Level, Types and Costs of Service?
- Other Considerations?

40

Property Taxation: Policy and Administration Reform

Prof. Roy Kelly
Sanford School of Public Policy, Duke University
(roykelly@duke.edu)

Azerbaijan State Economics University
(ASEU)
Spring 2010

1

ROLE OF PROPERTY TAXATION

Developed Countries

- **1-3 percent of GDP**
 - 2.5-3.0% Canada, US, UK
 - 1.5-2.5% NZ, Japan
 - 1.0-1.5% Aus, France, Den, Sweden

2-4 percent of Total Govt. Revenues

- **40-80 percent of Local Govt. Revenues**
 - Over 70% Canada, UK, US, Ireland, Aus, NZ

Developing/Transitional

- **0.5 percent of GDP**
 - Argentina (0.9%), Chile (0.6%), Indonesia (0.45%) Mexico (0.31%), Nicaragua (0.13%)

1-2 percent of Total Govt. Revenues

- **20-60 percent of Local Govt. Revenues**

Source: Bahl, 2002, Bird and Slack, 2004

2

WHY PROPERTY TAXATION?

1. Revenue Potential Is Good / Stable
2. Administration Is Relatively Simple
3. Economically Efficient For Land
4. Taxes On Ability To Pay
5. Captures Benefits Of Capital Investments

BUT: Politically sensitive (visible, lumpy, property owners)

Thus: How to simplify, improve accountability, reduce lumpiness/visibility, ...

3

BASIC POLICY VARIABLES



- What is taxed?
- How is it taxed?
- How to structure the tax rates?
- How to structure the tax admin?
- **What implementation strategy?**

4

WHAT IS TAXED?

• What is to be included?

- Land
- Buildings
- Machinery & Equipment

• What is to be excluded?

- Foreign Embassies
- Government
- Religious
- Education & Health



5

Recommendation 1: Tax Base Definition

Define a broad base to:

- Maximize fairness
- Minimize economic distortions
- Facilitate administration
- Encourage greater taxpayer equity & compliance
- Mobilize political support

Minimize exemptions

- Exemptions = subsidies (→ **equity**)
- Exemptions reduce tax base (→ **efficiency**)
- Exemptions reduce **revenues**
- Exemptions may complicate **administration**

roykelly@duke.edu

AFFORDABILITY: TAX RELIEF OPTIONS

ASSET RICH : CASH POOR

- **Tax Deferrals** (equals government loan)
- **Circuit Breakers** (reduction based on income)
- **Credit or Rebates** (tax amount reduction)
- **Differential Rates** (tax rate reduction)
- **Valuation Deduction**** (tax base reduction)
- **Exemptions** (tax base reduction)

** Valuation Deduction: Assessment Ratios, Building valuation deduction)

7

HOW IS IT TAXED?

PURPOSE:

To determine the relative allocation of the tax burden

Property Characteristics

- Per Property
- Area based

Ad Valorem (market-based tax):

- Individual Valuation: Kenya, Uganda, Malawi, South Africa
- Simple Mass Valuation: UK, Indonesia, and Latin America
- Computer Assisted Mass Appraisal (CAMA): North America, Europe

8

Recommendation 2: Assessment Basis (Area or Valuation)

Choose basis that will maximize equity at affordable administration and compliance costs

Ad valorem property tax correlated with market transactions can provide taxpayer equity and revenue buoyancy

9

WHAT TAX RATE STRUCTURE?

- **Uniform System**
- **Classified System**
- **Progressive Rates**
 - St. Lucia, Jamaica, Chile, Indonesia
 - Korea
- **Links to Decentralization:**
 - Provide local rate discretion
 - Range of tax rates, with min and max



10

Recommendation 3: Tax Rate Structure

Remember tax rate, tax assessment ratios, and valuation deductions determine effective statutory tax rates

Fewer effective statutory tax rates minimize economic distortions, simplify administration and reduce compliance costs

Grant tax rate discretion to local governments, within a range (min – max, with override option)

11

Impacts of Deductions and Assessment Ratio on Effective Tax Rates

	1	2	3	4	5	6
	Residence	Residence	Residence	Residence	Commercial	Industrial
Property Market Value	50,000	100,000	100,000	200,000	100,000	400,000
Appraised Value	50,000	100,000	90,000	180,000	90,000	350,000
Valuation Fixed Deduction	10,000	10,000	10,000	10,000	10,000	10,000
Owner Occupied Deduction	5,000	5,000	5,000	5,000	-	-
Taxable Value after deduction	35,000	85,000	75,000	165,000	80,000	340,000
Assessment Ratio (20%)	7,000	17,000	15,000	33,000	16,000	68,000
Taxable Value after Assessment Ratio	7,000	17,000	15,000	33,000	16,000	68,000
Tax Rate of 1%	1%	1%	1%	1%	1%	1%
Tax Amount (Annual)	70	170	150	330	160	680
Effective Tax Rate	0.14%	0.17%	0.15%	0.17%	0.16%	0.17%

Where **Effective Tax Rate** = tax amount paid / property market value

HOW TO ADMINISTER?

ADMINISTRATION COMPONENTS:

- Property Information
- Valuation Dimensions
- Assessment and Billing
- Revenue Collection
- Enforcement
- Taxpayer Services

CENTRAL, LOCAL OR CO-ADMINISTRATION?

Design Considerations:

- Economies of scale (functions)
- Administration capacity
- Need for information access (links to other taxes/policy)
- Institutional and personal incentives

13

©roykelly@duke.edu

TAX ADMINISTRATION IS TAX POLICY

Within the Policy Context:

- Is property information properly captured on the tax roll? Is it complete? Is it up-to-date? Is it accurate?
- Are estimated property valuations accurate and timely? Are appeals handled objectively and fairly, in a timely manner?
- Are assessments following legal norms? Are exemptions being properly applied? Are bills produced and delivered?
- Are payments collected and properly accounted for?
- Are premiums, sanctions and penalties administered in an open, transparent and accountable manner?
- Are taxpayers treated as customers, promoting greater voluntary compliance?

14

©roykelly@duke.edu

Analytical Model for Revenue Mobilization

$$\text{Revenues } \$\$\$ = \text{Tax Base} * \text{TR} * \text{CLR} * \text{CR} * \text{VR}$$

Policy Variables: Tax Base, TR
Administrative Variables: CLR, CR, VR

CLR	CR	VR	
.50	.50	.50	= .125
.75	.75	.75	= .422

Change = 230%

CLR: Collection Ratio (billing, collecting, enforcing)

CR: Coverage Ratio (property identification, cadastre)

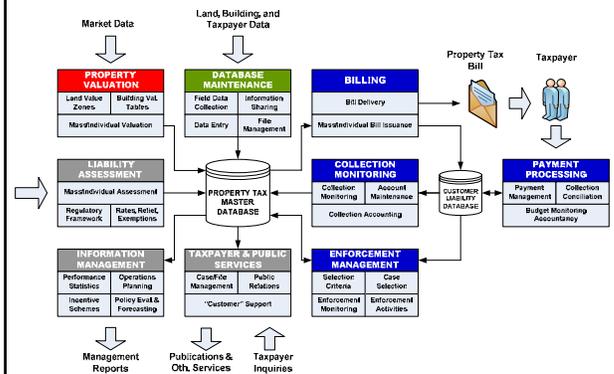
VR: Valuation Ratio (property valuation)

Taxpayer Service: (Collection, Coverage, and Valuation Ratios)

15

©roykelly@duke.edu

PROPERTY TAX OPERATIONS MANAGEMENT SYSTEM



16

Kelly and Sugana, 2007

Coverage Ratio

CR = recorded revenue base/potential revenue base

Problem:

- Low Coverage Ratio (30-70%)
- Institutional Constraints (Central or Local)
- Lack of Incentives (Personal and Institutional)

Solutions:

- Simple fiscal property registers
- Improve field administration w/ quality control
- Third party cross checks and public scrutiny
- Computerization (Property Tax Administration Management System)
- Separate property information collection from valuation functions

17

Valuation Ratio

VR = recorded valuation/actual valuation

Problem:

- Low Valuation Ratio (30-70%)
- Typically Single Parcel Valuation
- Lack of Incentives (Personal and Institutional)

Solutions:

- Shift from individual valuation to mass valuation
- Ensure supervision and quality control
- Establish independent appeals process
- Publicize the registers for quality control
- Shortened Valuation Cycle (3-5 years)

18

Collection Ratio

CLR = total collection / total liability

Problem:

- Low Collection Ratio (20-50%)
- Lack of Political Will
- Lack of Stakeholder Understanding

Solutions:

- Improve local services
- Mobilize political will
- Reduce compliance and administrative costs
- Improve taxpayer service and education
- Use incentives, sanctions, and penalties
- Improve local financial management

19

What is a Collection-Led Strategy?

Focus on Revenue Collection

- Ultimate Objective (others are only “intermediate”)
- Necessary to “realize” revenue, equity, efficiency and accountability objectives
- Catalyst (incentive) to improve all other aspects of property tax administration (ie, tax base information, valuations, and overall administration).

KEY: Where do you start with the property tax reform? Where do you intervene in the property tax administrative cycle?

20

royalty@duke.edu

Sequencing a Property Tax Reform Strategy

Collection-Led Strategy	Valuation-Pushed Strategy
Expected Activities: <ul style="list-style-type: none"> - Collection Systems - Delinquency Lists - Enforcement against noncompliance - Objections and Appeals - Property Information - Valuation Systems 	Expected Activities: <ul style="list-style-type: none"> - Valuation Systems - Property Revaluation - Property Information Collection - Mapping - Computer-Assisted Valuation (CAV) - Geographic Information System (GIS) - Objections and Appeals
Sequence of Outputs: <ul style="list-style-type: none"> - Improve Tax Collection - Potential for Enforcement <ul style="list-style-type: none"> - Improve Equity through Enforcement - Update Property Information - Improve Property Valuations 	Sequence of Outputs: <ul style="list-style-type: none"> - Revise Property Valuation Systems - New Maps (Often Digitized) - Update Information and Values - Computerize CAV and GIS Systems - Improve collections
Reform Priority Sequence: Collection, Coverage, Valuation Ratio	Reform Priority Sequence: Valuation, Coverage Ratio
Examples: Chile, Indonesia (late 1980s) Quezon City (Philippines) 2002	Examples: Philippines, Tanzania, Uganda, Others?
Appropriate Reform Environment: <ul style="list-style-type: none"> - Developing and Transitional Countries 	Appropriate Reform Environment: <ul style="list-style-type: none"> - OECD Countries



Philippines Property Taxation: Case Study of Quezon City*

- Former Capital of the Philippines
- Largest City in Metro Manila: 2.17 million residents occupying over 16,000 hectares of land area
- Largest concentration of national government offices and agencies, major radio and television stations, information technology centers, and the premier universities in the country
- Tax base of 440,000 real property taxpayers and 65,000 business establishments

* See V. Endriga (2008)

22

royalty@duke.edu

Financial Crisis in 2001

- Cash Balance in the General Fund of Quezon City was negative P10.35 million (US\$207,000) when Mayor Belmonte assumed office on July 1, 2001
- Inherited claims for payment amounting to P1.4 billion (US\$28m), including GSIS, Phil Health, BIR, Meralco etc.
- Bank Loan of P1.25 billion (US\$25m) left by previous administration with the Land Bank of the Philippines

Immediate Problem facing the Mayor:

How to contend with expected deficit of P970 million (US\$19.4m) to meet the P4.7 billion (US\$94m) 2001 budget?

royalty@duke.edu

Immediate Actions:

- **Cut Expenses:** Did not renew contract of over 7,000 casual employees (saved over P126 million in 3 months, hired back 30%)
- **Managed Expenditures:** prioritized all payment claims, no renovations to town hall (including mayor office), office supplies bought on immediate need basis in cash, new bidding to dramatically reduced prices by 22%, ...
- **Enhanced Revenues:** Collected P.5.4 billion, P1.7 billion more than previous year (an increase of 46%)

Immediate Results within 1 year

- P970 million deficit reduced to less than P100 million
- Paid off P900 million of inherited accounts payable.

NOW: Richest Local Government Unit (LGU)

Quezon Property Tax Reforms (2001-present): Focused on Collection Ratio

1. Enforced against Tax Delinquencies

- Allowed staggered payment of Delinquent Real Property Taxes upon payment of a minimum of 30% down, with balance payable within 6 months.
- Prepared at least 20 delinquency letters per day per employee assigned in the Real Estate Division.
- Automatically Generated and issued Computerized Delinquency Letters amounting to P10.7 Billion Pesos.
- Auction Sale of real property instead of Tax Amnesty every quarter (started 2003)

25

citykaly@kda.com

26

T.D. No.	PTN	VALUE	TAX YEAR	TAX DUE	PENALTY	TOTAL
D-001-04427	14-01281	9,492,488	2009-2010(1-2)	1,292,842.38	440,741.72	1,733,584.10
			TOTAL	1,292,842.38	440,741.72	1,733,584.10

27

28

29

2. Reduced Compliance Costs / Taxpayer Service

- Constructed taxpayers assessment and payment lounges (free Coffee & Ice Tea)



30

citykaly@kda.com

3. Introduced Positive Incentives for Payment

- Increased discount given to Real Property Taxpayers paying annually from 10% to 20%, and from 5% to 10% for those paying promptly quarterly.
- Posted 300 Billboards in major thoroughfares informing the date of the Auction Sale and the increased discount for annual payment
- Publicly recognized the 10 outstanding Taxpayers for Real Property and Business Taxes

31

<roykelly@duke.edu>

4. Improved Collection Accountability

- Computerization of systems and processes issued new Official Receipts with security features to identify and curb the proliferation of fake receipts.
- Reassignment of permanent employees to avoid familiarization with Taxpayer.
- Filed anti-graft cases with the office of the Ombudsman against employees issuing fake Real Property Tax Receipts, that resulted to the dismissal of 6 employees.
- Hired an independent and private encoding company to encode all Real Property Tax payment records and Tax Declarations

32

<roykelly@duke.edu>

Coverage / Collection / Valuation Ratio

- Implemented the Geographic Information System (GIS) for future tax mapping of Real Property to support Tax Mapping.

Coverage / Valuation Ratios

- Building Official instructed to forward to the City Assessor the building/occupancy permit, stating the total value of the construction cost, for issuance of a new tax declaration.
- City Engineer instructed to forward to the City Assessor all application for mechanical permit for issuance of a new tax declaration on machineries.

33

<roykelly@duke.edu>

APPLIED PUBLIC FINANCE FOR ECONOMIC DEVELOPMENT

Duke University (USA)
Azerbaijan State Economics University
Baku, Azerbaijan
Spring 2010

Indirect Taxes—Consumption and Production Taxes

Ruhana Sigmund (ruhana.sigmund@duke.edu)
DUKE CENTER FOR INTERNATIONAL DEVELOPMENT
DUKE UNIVERSITY BOX 90237, DURHAM, NC 27708-0237
TEL: +1 (919) 613-9228 ~ FAX: +1 (919) 684-2861
www.duke.edu/~duke-cid/



Indirect Taxes: Consumption and Production Taxes

- Direct vs. Indirect Taxes
- Features of Excise, Turnover Tax, and Sales Tax
- Externality Correction vs. Revenue Distortion
- Coordination of Indirect Taxes and Alternative Structures
- Unit vs. Ad Valorem Tax
- Tax Revenue Formulas—General One Market Case:
Unit and Ad Valorem Taxes
- Revenue-Maximizing Tax Rates
- Effect of Tax Rate Changes and Income Rises
- Multiple Market Case: Cross-Price Effects
- Estimation of Elasticities and Revenue Forecasting

Direct vs. Indirect Taxes

- **Direct Taxes: Income tax on individuals or firms (real or legal persons) or property**
 - Difficult to hide and, therefore, politically less acceptable
 - Can be made progressive, more revenue elastic, and less distortionary (being a more general tax)
 - Harder to administer
- **Indirect Taxes: Levied on consumption or trade transactions (internal and external) of specified goods and services**
 - Comparatively easy to hide, so politically more acceptable
 - Less revenue elastic, more distortionary (may change cons. behavior)
 - Can be made progressive to some extent by taxing "luxuries"
 - Relatively easy to administer
- **Traditionally, less developed countries relied more on indirect taxes; developed countries on direct taxes.**

Typical Indirect Tax Structures

- **Excise or Special Consumption Taxes**
 - Selective taxes on consumption with single stage collection at the manufacturer's level and imports
- **Turnover Taxes**
 - General taxes on destination principles (production excluding exports plus imports) with multi-stage collection through the retail level
 - Used as presumptive tax for small businesses and informal sector, if possible, to enforce issuance of invoices
 - Local governments typically adopt origin principle
- **Single-Stage Sales Tax**
 - General tax on consumption (production excluding exports plus imports) with single stage of collection point either at manufacturers', wholesale, or retail level

Typical Indirect Tax Structures

- **Value-Added Tax (VAT)**
 - General tax on consumption (production excluding exports plus imports) using credit-invoice method with multi-stage of collection through the retail level

Indirect Taxes: Design Options

- Types of Goods & Services: **General** or **Selective**?
 - Broad base (sales tax or VAT) or narrow base (excises)
- **Consumption** in Territory (**Origin Principle**) or **Production** in Territory (**Destination Principle**)?
 - In *origin principle*, tax imposed on all taxable products produced domestically (exports are taxable, while imports are not)
$$\text{Production (P)} = \text{Consumption (C)} - \text{Imports (M)} + \text{Exports (X)}$$
 - In *destination principle*, tax applied on all taxable products consumed domestically (imports are taxed, but not exports)
$$\text{Consumption (C)} = \text{Production (P)} - \text{Exports (X)} + \text{Imports (M)}$$
- **Tax Base** (Treatment of Investment Goods):
Consumption Only or **Include Capital Goods**?
 - Tax on Consumption, Income, or Gross Expenditure?
 - Is the base only C or (C + I)

Indirect Taxes: Design Options

- Coverage of Levels or Stages of Production: **Single Stage or Multiple Stages?**
 - Impose only at one point in production/distribution chain or at several points? Is it at manufacturing, wholesale, retail level or at all levels?
- **Type of Tax Rates: Unit Tax or Ad Valorem Tax?**
 - Tax per Unit—measured in weight / volume / length ... (or bottle, pack, etc.)

$$\text{Tax Liability} = \text{Quantity} \times \text{Tax Rate} = Q \times T$$
 - Tax as a percentage of value
- **Tax Computation Methods**
 - VAT offers different computational methods (addition, subtraction, credit)

Unit Tax vs. Ad Valorem Tax

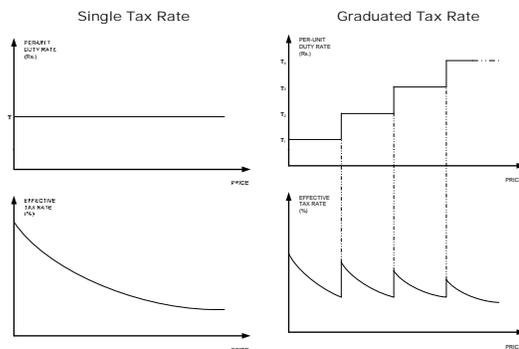
- **Indirect (excise) taxes are typically imposed as a specific/unit tax (e.g., \$2/bottle) or an ad valorem tax (e.g., 10%).**
 - Another form is through auctioning or selling for a fixed fee the right to sell certain commodities.

Unit Tax	Ad Valorem Tax
Advantages: <ul style="list-style-type: none"> - Easy to administer, need to estimate only the quantity of goods/services transacted. - Can be used to tax alcoholic beverages based on the alcohol content/intoxicating effect. - Provide stable revenues in case product price fluctuates following int'l prices. - Promote product variety and quality. 	Advantages: <ul style="list-style-type: none"> - No need for indexing of tax rates. As price goes up, tax revenue also increases.
Disadvantages: <ul style="list-style-type: none"> - As prices increase (w/ inflation), tax revenue unchanged (inelastic). Revenue decreases in real terms, unless indexed. - Discriminate against cheaper varieties. The effective tax rate of cheaper products is higher than that of the more expensive products. → A regressive tax 	Disadvantages: <ul style="list-style-type: none"> - More complicated administration; valuation accounting of sales is necessary. - Tend to reduce product variety and quality since the demand for higher priced goods tend to be more price elastic. - Can be unstable if product price fluctuates following international prices.

Unit Tax vs. Ad Valorem Tax

- **Additional Problems with Specific/Unit Tax:**
 - **Regressive:** Unit tax rate on commodity with wide range of qualities and corresponding prices has high tax rates on low-price goods.
 - **High Efficiency Cost of Tax:** Consumers substitute towards higher priced goods. Goods in different price categories are close substitutes.
 - **Discourage to Formalize Businesses:** Unit Tax exacerbates general problem of trying to encourage informal sector businesses into formal sector. High tax rates on low quality goods causes low income consumers to switch to informal sector products, often with low health standards (particularly with regard to alcoholic beverages).

Effective Tax Rate of Unit Tax



Features of Excise, Turnover Tax, and Sales Tax

- **Excise Tax**
 - Historically, a fee for the privilege of carrying out some kind of activity—usually production of commodity.
 - Excise taxes are typically charged on selective consumption items.
 - Can be levied on a number of items, ranging from fuel, alcohol, and tobacco products to telecommunication services, insurance policies, and air pollution.
 - Relatively easy to administer:
 - o Typically charged at the manufacture level and on imports, enhancing the control of the transactions
 - o The number of licensed manufacturers is relatively few and their sizes are relatively large
 - o Tax rates are sometimes specified as unit taxes to minimize problems in assessing the tax base
 - o The demand for excisable products is often inelastic allowing the imposition of relatively high tax rates

Features of Excise, Turnover Tax, and Sales Tax

- **Excise Tax (Cont'd)**
 - Can charge different rates for different items, or graduated rates for the same item at different prices/qualities.
 - Can be structured in co-ordination with a broad-based consumption tax, such as VAT, to improve progressivity.
 - o Not progressive by nature, but may be levied on luxury goods, e.g., furs, jewelry, and other luxury items.
 - Can be used as a policy tool to correct externalities, and revenue from excise taxes can be earmarked for certain government programs:
 - o Tax on fuels to reduce air pollution and road congestion, and the tax revenues can be used for highway maintenance
 - o Higher tax rate on lead gasoline for environmental protection
 - o Cigarette tax and higher tax for low quality liquor for public health costs

Features of Excise, Turnover Tax, and Sales Tax

Excise Tax (Cont'd)

- **Typical Targets:** Alcoholic Beverages, Tobacco Products, Petroleum Products, and sometimes "luxury goods" (jewelry, cosmetics, etc.)
- **Rationale:**
 - o **Revenue Elasticity:** Luxury goods with high income elasticity gives high revenue elasticity and/or goods with low price elasticity of demand allows higher tax rate
 - o **Progressive:** Luxury goods tend to be consumed more by high income groups; essentials are often sold through informal sector
 - o **Low Efficiency Cost:** Relatively low price elasticity of demand
 - o **Offset Negative Externality and Demerit (Sin) Goods**
 - o **Good Tax Handle:** low administrative costs and tight controls feasible to reduce evasion given high tax rates result in high incentives for corruption

Features of Excise, Turnover Tax, and Sales Tax

Excise Tax (Cont'd)

- Typically charged and collected at **manufacturers level and imports**, but to avoid transfer pricing problems in sales to related wholesalers, **some countries use reference retail prices** (such as suggested retail prices for motor vehicles). This requires sophisticated administration.
- **Specific or unit taxes** are sometimes used to reduce valuation problems. For example, if tax charged at oil refinery or tank farm gate on petroleum products, then no sale may be occurring (petroleum distributor may own oil products coming from refinery), and hence, problem of establishing sales price.

Features of Excise, Turnover Tax, and Sales Tax

Turnover Tax

- A single, ad valorem tax rate, multi-stage general tax imposed on every transaction or sales between firms.
- Tax base obviously large, number of taxpayers also large. *High cost of administration.*
- With large tax base, rate need not be high to raise given amount of revenues. *Politically attractive.*
- **Disadvantages:**
 - o Avoidance of tax possible through tax integration. If all stages of production (producer/wholesaler/retailer) integrated in a single firm, total revenue will fall.
 - o Tax on tax (cascading effect) → *not efficient.*
 - o Due to cascading and the possibility of integration, there may be differential tax rates on industrial inputs, creating cost deviations in the same sector.

Features of Excise, Turnover Tax, and Sales Tax

Turnover Tax (Cont'd)

- Numerical Example:

	Sales/ Margin	Tax Base	Tax @ 5%
Producer	100	= 100	= 100 x 5% = 5
Wholesaler	15	= 100+15+5 = 120	= 120 x 5% = 6
Retailer	35	= 120+35+6 = 161	= 161 x 5% = 8
Total	150	381	19

- If a 10% tax levied at retail level (single stage), the tax revenue would have been \$15. To get the same revenue of \$15 by a turnover tax system, a tax rate of 4% would be needed.

→ Low tax rate, but taxes to be collected at all levels.

Features of Excise, Turnover Tax, and Sales Tax

Single-Stage Sales Tax

- Can be levied either at manufacturing, wholesale, or retail stage.
- Manufacturing-level sales tax easy to administer (few taxpayers). As tax base expands (to wholesale and retail levels), administration gets complicated and chances of evasion increase.
- Multiple rates and higher tax rates encourage evasion.

Features of Excise, Turnover Tax, and Sales Tax

Single-Stage Sales Tax: Manufacturing Level

- All inputs used by capital goods producers are taxed. Thus, increasing cost of capital goods.
 - It is necessary that manufacturers of capital goods are exempted from tax on their inputs through licensing of genuine manufacturers (Ring-Fence System).
- Should be levied both on domestic production (final) and imports to avoid discrimination. However, imported inputs are tax exempt to avoid cost escalation.
- Normally, services, agricultural products (unprocessed), and exports are exempt.
- Incentive to reduce manufacturing price and increase wholesale price, reducing the tax base.

Features of Excise, Turnover Tax, and Sales Tax

Single-Stage Sales Tax: Manufacturing Level (Cont'd)

- Illustration:

Transfer price from manufacturer to wholesaler.

	(w/o Transfer Price)		(w/ Transfer Price)	
	Sales/ Margin	Tax @ 10%	Sales/ Margin	Tax @ 10%
Manufacturer	100	10	80	8
Wholesaler	15		35	
Retailer	35		35	
Total	150	10	150	8

Tax saving of 2

Features of Excise, Turnover Tax, and Sales Tax

Single-Stage Sales Tax: Wholesale Level

- Wholesale level is not well defined—not very common; important to register all wholesalers.
- Larger base than manufacturer-level tax. Smaller tax rate to bring the same revenue.
- May encourage some manufacturers to sell goods to retailers or final consumers directly; increasing their profit margin, reducing tax base.

Single-Stage Sales Tax: Retail Level

- Tax base largest, higher tax revenue. Or, lower tax rate to reach the same revenue objective.
- Large number of taxpayers leads to higher administrative costs. Application of multiple rates specially problematic.
- If informal sector is large or record-keeping is unsatisfactory, chances of large scale of tax evasion. High incentive to escape registration.

Features of Excise, Turnover Tax, and Sales Tax

Single-Stage Sales Tax: Retail Level (Cont'd)

- Illustration:

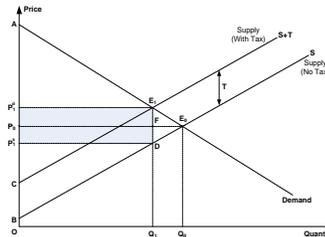
	Margin	Sales	Tax @ 5%
Producer	150	150	
Wholesaler	30	180	
Retailer	20	200	10
Total (Tax Inclusive)		210	10

Margin of exempt (or evaded) retailers is 30, a subsidy of 50%.

→ Treat unregistered retailers as consumers and charge tax on sales by manufacturers/wholesalers to them.

Tax Revenue Formula: Unit Tax

The General Case of One Market



$$\text{Tax Revenue: } R = T \cdot Q_1 = T \cdot (Q_0 + \Delta Q)$$

$$T = \Delta P^d - \Delta P^s \quad \text{where } \Delta P^d = (P^d - P_0) \quad \text{and } \Delta P^s = (P^s - P_0)$$

$$\Delta Q = Q_1 - Q_0 = \Delta Q^d = \Delta Q^s$$

Tax Revenue Formula: Unit Tax

The General Case of One Market (Cont'd)

From the definition of elasticity,

$$\text{- Own-price elasticity of demand: } \eta = \frac{\Delta Q^d}{\Delta P^d} \frac{P_0}{Q_0} \rightarrow \Delta P^d = \frac{\Delta Q^d}{\eta} \frac{P_0}{Q_0}$$

$$\text{- Own-price elasticity of supply: } \epsilon = \frac{\Delta Q^s}{\Delta P^s} \frac{P_0}{Q_0} \rightarrow \Delta P^s = \frac{\Delta Q^s}{\epsilon} \frac{P_0}{Q_0}$$

$$\text{Thus, } T = \frac{\Delta Q}{\eta} \frac{P_0}{Q_0} - \frac{\Delta Q}{\epsilon} \frac{P_0}{Q_0} \quad \text{or } \Delta Q = T \frac{Q_0}{P_0} \left(\frac{\epsilon \eta}{\epsilon - \eta} \right) \rightarrow \Delta P^d = T \left(\frac{\epsilon}{\epsilon - \eta} \right)$$

$$\rightarrow \Delta P^s = T \left(\frac{\eta}{\epsilon - \eta} \right)$$

$$\text{Tax Revenue: } R = T Q_0 + T^2 \frac{Q_0}{P_0} \left(\frac{\epsilon \eta}{\epsilon - \eta} \right) \quad \text{or } R = T Q_0 \left(1 + \frac{T}{P_0} \times \frac{\epsilon \eta}{\epsilon - \eta} \right)$$

$$\text{Excess Burden/Dead Weight Loss } DWL = \frac{1}{2} \times T \times \Delta Q = \frac{1}{2} T^2 \frac{Q_0}{P_0} \left(\frac{\epsilon \eta}{\epsilon - \eta} \right)$$

Tax Revenue Formula: Unit Tax

The General Case of One Market (Cont'd)

Illustration:

Suppose the initial price of gasoline is 60 cents per liter and the quantity sold and bought is 5,000 liters per day. How much revenue will the government collect if a specific tax of 15 cents is imposed? Assume $\eta = -1$ and $\epsilon = 2$.

$$\Delta P^d = T \left(\frac{\epsilon}{\epsilon - \eta} \right) = 10 \text{ cents; } \Delta P^s = 5 \text{ cents; } \Delta Q = T \frac{Q_0}{P_0} \left(\frac{\epsilon \eta}{\epsilon - \eta} \right) = -833 \text{ liters}$$

$$\text{Tax Revenue: } T \times Q_1 = 0.15 \times (5,000 - 833) = \$625$$

$$\text{Excess Burden: } \frac{1}{2} \times T \times \Delta Q = 0.5 \times 0.15 \times (833) = \$62.5$$

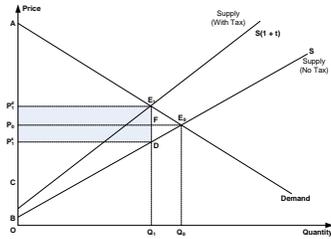
The same results are obtained using the tax revenue and excess burden formulas:

$$R = T Q_0 \left(1 + \frac{T}{P_0} \times \frac{\epsilon \eta}{\epsilon - \eta} \right) = \$625$$

$$DWL = \frac{1}{2} T^2 \frac{Q_0}{P_0} \left(\frac{\epsilon \eta}{\epsilon - \eta} \right) = \$62.5$$

Tax Revenue Formula: Ad Valorem Tax

The General Case of One Market



Tax Revenue: $R = tP_1 \cdot Q_1 = t \cdot (P_0 + \Delta P^s) (Q_0 + \Delta Q)$
 $tP_1^s = \Delta P^d - \Delta P^s$ where $\Delta P^d = (P^d - P_0)$ and $\Delta P^s = (P^s - P_0)$
 $\Delta Q = Q_1 - Q_0 = \Delta Q^d = \Delta Q^s$

Tax Revenue Formula: Ad Valorem Tax

The General Case of One Market (Cont'd)

Since $\Delta Q^d = \Delta Q^s \rightarrow \varepsilon \cdot \Delta P^d = \eta \cdot \Delta P^s$

$$tP_1^s = t(P_0 + \eta / \varepsilon \times \Delta P^d) = \Delta P^d - \eta / \varepsilon \times \Delta P^d$$

$$\rightarrow \Delta P^d = tP_0 \frac{\varepsilon}{\varepsilon - \eta(1+t)} ; \Delta P^s = tP_0 \frac{\eta}{\varepsilon - \eta(1+t)}$$

$$\rightarrow \Delta Q = \Delta Q^s = tQ_0 \frac{\varepsilon \eta}{\varepsilon - \eta(1+t)}$$

Tax Revenue: $R = tP_0 Q_0 + t^2 P_0 Q_0 \left[\frac{(\varepsilon + 1)\eta}{\varepsilon - \eta(1+t)} \right]$

Excess Burden/Dead Weight Loss: $DWL = -\frac{1}{2} t^2 P_0 Q_0 \left[\frac{\varepsilon - \eta}{\varepsilon - \eta(1+t)} \right] \left[\frac{\varepsilon \eta}{\varepsilon - \eta(1+t)} \right]$

Tax Revenue Formula: Ad Valorem Tax

The General Case of One Market (Cont'd)

Illustration:

Suppose the initial price of gasoline is 60 cents per liter and the quantity sold and bought is 5,000 liters per day. How much revenue will the government collect if a tax rate of 25% is imposed? Assume $\eta = -1$ and $\varepsilon = 2$.

$$\Delta P^s = tP_0 \frac{\eta}{\varepsilon - \eta(1+t)} = -4.62 \text{ cents}; \Delta Q = tQ_0 \frac{\varepsilon \eta}{\varepsilon - \eta(1+t)} = -770 \text{ liters}$$

$$\text{Tax Revenue: } t \times (P_0 + \Delta P^s) \times Q_1 = 0.25 \times (60 - 4.62) \times (5,000 - 770) = \$586$$

The same results are obtained using the tax revenue and excess burden formulas:

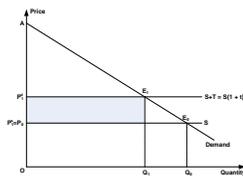
$$R = tP_0 Q_0 + t^2 P_0 Q_0 \left[\frac{(\varepsilon + 1)\eta}{\varepsilon - \eta(1+t)} \right] = \$586$$

Note: If the ad valorem tax rate is set at the same effective tax rate as the per unit tax, ($t = TP_0$), the revenue from ad valorem tax is less if the supply curve is upward sloping.

General Implications

- When tax rate increases, the tax revenue will first rise and then fall.
 - Tax revenue will be lower if demand and/or supply is more elastic; e.g., consumers will shift to other goods as the price goes up. On the contrary, revenue will be easy to collect for goods with inelastic demand.
 - Excess burden rises with the square of the tax rate. Thus, when the tax rate doubles, the efficiency cost is quadruple.
 - High tax rates reduce efficiency. Thus, lowering tax rates will increase economic efficiency.
- Lower and uniform tax rate on a broader base will be a less inefficient way of raising revenues.

The Case of Perfectly Elastic Supply



- If supply is infinitely elastic (i.e., horizontal supply curve), then the formulas can be expressed as:

- UNIT TAX: $R = TQ_0 + T^2 \frac{Q_0}{P_0} \eta$ $DWL = \frac{1}{2} T^2 \frac{Q_0}{P_0} \eta$

- ADVALOREM TAX: $R = tP_0 Q_0 + t^2 P_0 Q_0 \eta$ $DWL = \frac{1}{2} t^2 P_0 Q_0 \eta$

→ If demand is unit elastic, the total tax revenue will reach maximum when the tax rate is 50%

Revenue-Maximizing Tax Rate

- Unit Tax (Linear Demand Curve)

$$\frac{dR}{dT} = Q_0 + 2T \frac{Q_0}{P_0} \left(\frac{\varepsilon \eta}{\varepsilon - \eta} \right) = 0 \rightarrow T^* = -\frac{P_0 (\varepsilon - \eta)}{2 (\varepsilon \eta)}$$

For horizontal demand curve: $T^* = -\frac{P_0}{2\eta}$

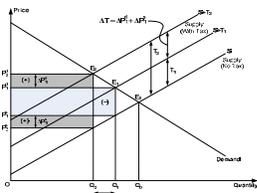
- Ad Valorem Tax (Linear Demand Curve)

$$\frac{dR}{dt} = P_0 Q_0 \left[1 + 2t \frac{(1+\varepsilon)\eta}{[\varepsilon - \eta(1+t)]} + t^2 \frac{(1+\varepsilon)\eta^2}{[\varepsilon - \eta(1+t)]^2} \right] = 0 \rightarrow t^* \approx -\frac{\varepsilon - \eta}{2\varepsilon\eta + \eta}$$

For horizontal demand curve: $t^* = -\frac{1}{2\eta}$

Note: In the above equations, elasticities are measured at the market equilibrium with no tax.

Effect on Revenue when Tax Rate Changes



UNIT TAX:

$$\Delta R = \Delta T (Q_1 + \Delta Q_1) + T_1 \Delta Q_1$$

$$\Delta R = (\Delta T \times Q_1) + (T_2 \times \Delta Q_1)$$

$$\frac{\Delta R}{R} = \frac{\Delta T}{T_1} \left[1 + \frac{\epsilon \eta T_2}{\epsilon T_1 + P_1^s (\epsilon - \eta)} \right]$$

For horizontal supply curve:

$$\frac{\Delta R}{R} = \frac{\Delta T}{T_1} \left[1 + \frac{\eta T_2}{T_1 + P_1^s} \right]$$

AD VALOREM TAX:

$$\frac{\Delta R}{R} = \frac{\Delta t}{t_1} \left[1 + t_2 \left[\frac{(\epsilon + 1)\eta}{\epsilon(1+t_1) - \eta(1+t_2)} \right] + \Delta t \left[\frac{\epsilon \eta^2}{\epsilon(1+t_1) - \eta(1+t_2)^2} \right] \right]$$

For horizontal supply curve: $\frac{\Delta R}{R} = \frac{\Delta t}{t_1} \left(1 + \frac{t_2 \eta}{1+t_1} \right)$

Effect on Revenue when Tax Rate Changes

Illustration:

Estimate the new tax revenue when the tax rate is changed from \$10 per liter to \$15 per liter. The current tax revenue is \$100,000, and the price per liter before the tax is \$20. Supply is infinitely elastic, whereas the elasticity of demand is close to -1.2.

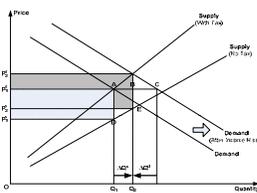
For an ad valorem tax with infinitely elastic supply, the formula reduces to:

$$\frac{\Delta R}{R} = \frac{\Delta T}{T_1} \left[1 + \frac{\eta T_2}{T_1 + P_1^s} \right]$$

$$\frac{\Delta R}{R} = \frac{5}{10} \left[1 + \frac{-1.2 \times 15}{10 + 20} \right] = 20\%$$

The percent increase in the tax revenue is much less than the percent change in the tax rate. The new tax revenue is estimated at \$100,000 x (1 + 20%) = \$120,000.

Effect on Revenue when Income Rises



Income Elasticity of Demand:

$$\eta^Y = \frac{\% \Delta Q}{\% \Delta Y}$$

UNIT TAX:

$$\frac{\Delta R}{R} = \frac{\epsilon \cdot \eta^Y \cdot \% \Delta Y}{\epsilon - \eta / (1 + T/P_1^s)}$$

AD VALOREM TAX:

$$\frac{\Delta R}{R} = \left(1 + \frac{\eta^Y \cdot \% \Delta Y}{\epsilon - \eta} \right) \left(1 + \frac{\epsilon \cdot \eta^Y \cdot \% \Delta Y}{\epsilon - \eta} \right) - 1$$

For horizontal supply curve, both cases: $\frac{\Delta R}{R} = \eta^Y \cdot \% \Delta Y$

Effect on Revenue when Income Rises

Illustration:

The tax revenue from beer for the current fiscal year is \$100,000. Beer is taxed at \$.30 per can, and the average price for beer is around \$2 per can. Supply of beer is infinitely elastic, whereas the elasticity of demand is close to -0.9.

Income elasticity of demand for beer is estimated at 1.5. The per capita GDP for next year is estimated to increase by 4% in real terms, and inflation is expected to be around 6%.

The percent change in income, or GDP, in nominal terms is:

$$[(1 + 4\%) \times (1 + 6\%) - 1] = 10.24\%$$

Using equation: $\frac{\Delta R}{R} = \eta^Y \cdot \% \Delta Y$,

the percent change in tax revenue due to change in income is estimated at $1.5 \times 10.24\% = 15.36\%$.

Thus, the projected tax revenue is \$100,000 x (1 + 15.36%) = \$115,360.

Multiple Market and Cross Price Elasticity

- When analyzing the impact of a tax, it is often not sufficient to look at a single market. There may be other goods which are close substitutes of the taxed commodity.

The Case of Multiple Markets:

There are goods that are either substitutes of complements. Examples with close substitutes and complements include:

- Minivan versus SUV
- Tea versus Coffee (substitutes); Tea/Coffee and Milk (complements)
- Butter versus Margarine
- Cigarettes versus Rolling Tobacco
- Gasoline versus Diesel
- Beer, Wine, and Spirits
- Taxable Goods versus Smuggled Goods

- Demand elasticity of the good is expected to be high when substitutes exist.

Multiple Market and Cross Price Elasticity

Demand for a Good

Demand for a particular good (*i*th good) can be expressed as follows:

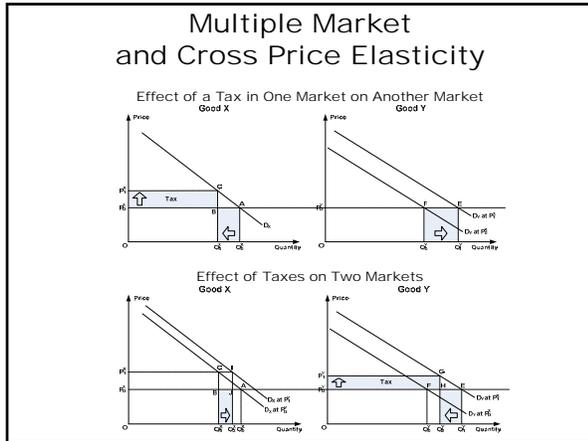
$$Q_i = f(P_1, P_2, \dots, P_j, \dots, Y, \text{taste})$$

- Goods *i* and 1 are substitute, if P_1 increases, Q_i also increases
- Goods *i* and 1 are complements, if P_1 increases, Q_i decreases
- The good *i* is normal, when Y increases, Q_i also increases
- The good *i* is inferior, when Y increases, Q_i decreases

- Cross-Price Elasticity of Demand between good *i* and *j* (substitutes and complements) is defined as the percentage change in quantity of good *i* with respect to the percentage change in price of good *j*.

$$\eta_{i,j} = \frac{\Delta \% Q_i}{\Delta \% P_j}$$

For substitutes, $\eta_{i,j}$ is positive and negative for complements. Clearly, when $i=j$ the $\eta_{i,j}$ is own-price elasticity of demand, i.e., the same as η .



Multiple Market and Cross Price Elasticity

- The total tax revenue from all commodities subject to unit taxes:

$$TR_i = \sum_{i=1}^n R_i = \sum_{i=1}^n T_i Q_i$$
- Assuming perfectly elastic supply, the demand prices increase by the same amount as the tax. If only the tax levied on good X changes, the change in the total revenue:

$$dTR = Q_X dT_X + \sum_{i=1}^n T_i dQ_i / dT_X$$

$$dTR = Q_X dT_X + \sum_{i=1}^n T_i dQ_i / dP_X$$

$$dTR = Q_X dT_X + \sum_{i=1}^n T_i \eta_{iX} \frac{Q_i}{P_X}$$

Multiple Market and Cross Price Elasticity

$$dTR = Q_X dT_X + \sum_{i=1}^n T_i \eta_{iX} \frac{Q_i}{P_X}$$

- Dividing both sides by TR_1 and multiplying the first term by P_X^d / P_X^d

$$\frac{dTR}{TR_1} = \frac{P_X^d Q_X}{TR_1 P_X^d} \frac{dT_X}{P_X^d} + \frac{1}{P_X^d} \sum_{i=1}^n \eta_{iX} \frac{T_i Q_i}{TR_1}$$

$$\frac{\Delta TR}{TR_1} = \frac{1}{P_X} \left(\frac{P_X^d Q_X}{TR_1} \Delta T_X + \sum_{i=1}^n \eta_{iX} \frac{R_i}{TR_1} \right)$$

Multiple Market and Cross Price Elasticity

Illustration:
Suppose the retail price for beer is \$20 per case, and the quantity of beer sold is 30,000 cases. Given the data on the table below, calculate the expected change in total revenue if the specific tax on beer is increased by \$1.

	Tax Revenue Collection	Share in Tax Collection	$\eta_{i,beer}$
Beer	100,000	50%	-0.700
Wine	60,000	30%	0.1
Soda	40,000	20%	0.1
Total	200,000	100%	

$$\frac{\Delta TR}{TR_1} = \frac{1}{20} \left[\left(\frac{20 \times 30}{200} \right) (1) + (-0.7)(50\%) + (0.1)(30\%) + (0.1)(20\%) \right]$$

$\frac{\Delta TR}{TR_1} = 13.5\%$

- Total Revenue is expected to rise by 13.5% to \$227,000.
- If substitution effect is not considered, the increase in tax revenue would be underestimated by 0.25%.

Estimation of Elasticities

- It is common—and usually reasonable—to assume that supply of main commodities subject to excise taxes, such as petroleum products and alcoholic beverages, is infinitely elastic, particularly when annual data are being used.
- When taxes are added, the supply curve becomes the price + tax. The cost of supplying the commodity and the tax rates may vary from year to year.

- Thus, the movement of tax-inclusive supply curve traces out equilibrium points along the demand curve.
- Under this assumption, every price and quantity combination which is observed in each year must be on the demand curve.

Choosing the Variables

The quantity of goods consumed would be independent variable for the regression analysis to estimate demand elasticities. Theory suggests that the independent variables include the following:

$$Q_t = f(P_{own}, Y, P_{subs}, P_{comp}, Q_{t-1}, \dots)$$

- The price of the commodity.** This should be deflated, for instance by the consumer price index, to give the real price of the commodity. The higher commodity price is expected to be associated with a lower quantity demanded. Thus, the own-price elasticity is expected to be *negative*.
- Income.** With higher incomes, more individuals can afford to consume more. If the dependent variable is consumption per capita, then income needs to be expressed in per capita terms as well. The most commonly used variable is real GDP per capita, but one could make a case for using real consumption expenditure per capita or real disposable income per capita.

Choosing the Variables

- **The prices of substitutes and complements.** Understanding the local markets is important to include the most important substitutes or complements for the commodity in question. If the real price of the commodity rises, for example, the quantity of substitute demanded would also rise.
- **The Quantity Consumed in the Previous Period.** It is plausible to assume that consumers will respond to price increase with a lag. Consumers may not immediately adjust their alcoholic beverage or fuel consumption even when the price is increased significantly.

For example, in the case of fuel prices, demand will adjust more over time as consumers change their fuel using vehicles and other equipment in response to the changing price of fuel.

In these cases, differences arise in the estimates of the short-run and long-run price elasticities of demand, the latter being higher than the former.

Basic Regression using OLS

- The following simple regression model can be used to estimate the price and income elasticities of demand:

$$\text{Log}(Q_t) = a_1 \cdot \text{Log}(\text{real}P_t^{\text{own}}) + a_2 \cdot \text{Log}(\text{real}P_t^{\text{subs}}) + a_3 \cdot \text{Log}(\text{real}P_t^{\text{comp}}) + a_4 \cdot \text{Log}(\text{RGDP}) + C$$

where:

- Q_t : Quantity demanded (can also be measured on a per capita basis) of the commodity at year t
- $\text{real}P_t^{\text{own}}$: Real price of the commodity at year t
- $\text{real}P_t^{\text{subs}}$: Real price of substitute at year t
- $\text{real}P_t^{\text{comp}}$: Real price of complement at year t
- RGDP : Real GDP (can also be measured per capita) at year t

- The regression coefficient a_1 gives the own-price elasticity of demand, while a_2 gives the income elasticity of demand. The regression coefficients a_3 and a_4 give the cross-price elasticity of substitute and complement respectively.

Exploring Dynamics using OLS

- The previous regression is a static model, in the sense that it assumes that consumers fully adjust their quantity demanded in year t in response to the income and price levels observed in year t .
- For goods such as fuel or alcoholic beverages, it is more plausible that consumers adjust with a lag. For instance, a higher price of alcoholic beverages may eventually lead consumers to consume less, but this may take gradually.
- The *partial adjustment* model begins with:

$$\text{Log}(Q_t) = \text{Log}(Q_{t-1}) + k \cdot [\text{Log}(Q_t^*) - \text{Log}(Q_{t-1})]$$

where:

- Q_t^* : The desired level of Q_t
- k : The proportion of the adjustment from the previous years' level to this year desired level that takes place in year t . The adjustment parameter k is expected to be between 0 (slow adjustment) and 1 (rapid adjustment).

Exploring Dynamics using OLS

- Substituting the above simple regression model into Q_t^* in the partial adjustment model gives:

$$\text{Log}(Q_t) = k \cdot a_1 \cdot \text{Log}(\text{real}P_t^{\text{own}}) + k \cdot a_2 \cdot \text{Log}(\text{real}P_t^{\text{subs}}) + k \cdot a_3 \cdot \text{Log}(\text{real}P_t^{\text{comp}}) + k \cdot a_4 \cdot \text{Log}(\text{RGDP}) + (1-k) \cdot \text{Log}(Q_{t-1}) + C$$

- The above regression model is very similar to that of the basic regression, except that now it includes the lag of consumption in the regression analysis.
- The regression coefficient for the last term is equal to $(1-k)$. Thus, k equals to 1 minus the estimated regression coefficient.
- This k can be interpreted as the percent adjustment to price and income takes place in a given year. The coefficients of the independent variables ($k \cdot a_1, k \cdot a_2, k \cdot a_3, \dots$) can be interpreted as **short run elasticities**.
- ($k \cdot a_1, k \cdot a_2, k \cdot a_3, \dots$) are the coefficients estimated by the regression analysis. If these numbers are divided by k , it would give the long-run elasticities. In other words, a_1, a_2, \dots and so on are **long-run elasticities**.

APPLIED PUBLIC FINANCE FOR ECONOMIC DEVELOPMENT

Duke University (USA)
Azerbaijan State Economics University
Baku, Azerbaijan
Spring 2010

Value-Added Tax

Rubina Sigmund (rubina.sigmund@duke.edu)
DUKE CENTER FOR INTERNATIONAL DEVELOPMENT
DUKE UNIVERSITY BOX 90237, DURHAM, NC 27708-0237
TEL: +1 (919) 613-9238 ~ FAX: +1 (919) 684-2861
www.duke.edu/~dcid/



Value-Added Tax

- Introduction
- Types of VAT Bases
- VAT Computation Methods
- Exemption and Zero Rating
- Determination of VAT Payable
- VAT through Supply Chain
- Tax Policy Issues

2

Introduction

- The value-added tax (VAT) is an indirect tax collected at various stages of production and distribution based on the value added at each stage
- In effect, it is a sales tax administered in a different way
- The most prevalent VAT system is a consumption-type, multi-stage sales tax based on the destination principle.
- The VAT is typically assessed using the credit-invoice method.
- The VAT analysis and revenue estimation methodology presented here assumes the adoption of the most prevalent VAT system.

3

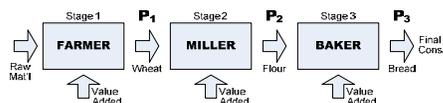
What is Value Added?

- Value that a producer adds to the raw materials or purchases before selling the new or improved good/service
 - Inputs include raw materials, transport, utilities, etc. purchased by a firm. What about labor, interest, and rent?
 - Value Added: The difference in the value of inputs and value of final product.
- Two ways of looking at value added:
 - Value added at different stages of production of goods and services;
 - Value Added = Wages + Gross Profits + Interest + Rent**
 - or
 - Value Added = Price of Output – Cost of Inputs**

4

Value Added through Supply Chain

Illustration:



- Value Added at Farmer's Level: $P_1 = wL + rK$
where w = wage rate L = labor hours
 r = cost of capital K = capital used
- Value Added at Miller's Level: $P_2 - P_1$
- Value Added at Baker's Level: $P_3 - P_2$
- Total Value Added: P_3

5

Why Adopt Value-Added Tax?

- Existing tax laws may be unsatisfactory
- Customs union requirement (replacement of border taxes)
- VAT is helpful in increasing tax revenue, while reducing other taxes, e.g., replacing import duty or corporate income tax

6

Types of VAT Bases

- **Consumption Type:** The VAT base is $(C + G_c)$: Gross receipts minus intermediate goods minus capital expenditures. Remainder is consumer goods; same base as that of retail sales tax.

The tax is imposed only on consumer goods (goods which are used for non-productive consumption). Therefore, capital goods (new acquisition of the depreciable assets) are excluded.

- **Net National Product (NNP), or Income, Type:** The VAT base is $(C + I - D + G_c)$: Gross receipts minus intermediate input minus depreciation of capital goods.

This is similar to income tax imposed on both incomes earned by capital and labor to produce taxable goods and services. According to this method, the depreciation allowances should be excluded.

7

Types of VAT Bases

- **Gross National Product (GNP) Type:** The VAT base is $(C + I + G_c)$. All final goods and services, both capital and consumer goods, are taxed. The tax base is simply gross receipts minus cost of intermediate goods. No deduction even for depreciation.

All final goods and services produced and sold in the taxable period are taxed. Therefore, capital goods are included and depreciation allowances are not considered as an input.

$$\text{Base} = \text{Wage} + \text{Interest} + \text{Profit} + \text{Rent} + \text{Depreciation}$$

8

VAT Computation Methods

- **Addition Method**

- Value added (wages + profits) is taxed at each stage

$$VAT = t_1 \times \text{Wages} + t_1 \times \text{Profits}$$

- **Disadvantage:** To apply this method, it needs to find out payments to labor and capital at each stage. It is difficult to apply. However, in some cases this can be the only alternative.

- It is effectively a combination of payroll and corporate income tax (CIT). Estimating profits has some problems as faced in the case of CIT.

9

VAT Computation Methods

- **Subtraction Method**

$$VAT = t \times (\text{Price of Output} - \text{Cost of Inputs})$$

- **Disadvantage:** Difficult to apply multiple rates, including zero rate
- If tax rates at stage 1, 2, and 3 are t_1 , t_2 , and t_3 respectively, the total tax is:

$$t_1 P_1 + t_2 (P_2 - P_1) + t_3 (P_3 - P_2)$$

or $(t_1 - t_2)P_1 + (t_2 - t_3)P_2 + t_3 P_3$

10

VAT Computation Methods

- **Credit-Invoice Method**

- Outputs are taxed and credits are given for taxed paid on inputs.

If t_1 and t_2 are tax rates on input and output respectively:

$$VAT = t_2 \times \text{Output} - t_1 \times \text{Input}$$

$$t_1 P_1 + (t_2 P_2 - t_1 P_1) + (t_3 P_3 - t_2 P_2) = t_3 P_3$$

- Effectively, the total amount of tax collected is the same as that at the last point.

- Notice that **tax base** is not calculated. Only taxes paid on output and input are calculated.

- Credit-invoice method is more acceptable because:

- Invoice is a crucial evidence for sale transaction and tax payment, create a good audit trail
- Multiple tax rates may be easily applied

11

Exemption and Zero Rating

- **Exemption:** Tax is not charged for output, and no tax credit is given for input.
- **Zero-Rating:** Tax is charged at 0% for output (*effectively no tax is charged for output*), and tax credit is given for input.

- **Note:** Multiple rates and zero-rating would—at some point—require the government to pay refund to VAT payers, who primarily deal with exports. Dealing with refunds payments is often considered the weakest link in the VAT administration.

12

Exemption and Zero Rating

- Calculation of VAT with Exemption:

If farmer (**Stage 1**) is VAT exempt, it is no longer part of the VAT chain.
Tax revenue:

	Subtraction Method	Credit Method
Tax Paid by Farmer	0	0
Tax Paid by Miller	$t_2(P_2 - P_1)$	t_2P_2
Tax Paid by Baker	$t_3(P_3 - P_2)$	$(t_3P_3 - t_2P_2)$
Total VAT	$t_2(P_2 - P_1) + t_3(P_3 - P_2)$	t_3P_3
Increase/Decrease	↓	Neutral

13

Exemption and Zero Rating

- Calculation of VAT with Exemption:

If miller (**Stage 2**) is VAT exempt, it is no longer part of the VAT chain.
Tax revenue:

	Subtraction Method	Credit Method
Tax Paid by Farmer	t_1P_1	t_1P_1
Tax Paid by Miller	0	0
Tax Paid by Baker	$t_3(P_3 - P_2)$	t_3P_3
Total VAT	$t_1P_1 + t_3(P_3 - P_2)$	$t_1P_1 + t_3P_3$
Increase/Decrease	↓	↑

14

Exemption and Zero Rating

- Calculation of VAT with Exemption:

If baker (**Stage 3**) is VAT exempt, it is no longer part of the VAT chain.
Tax revenue:

	Subtraction Method	Credit Method
Tax Paid by Farmer	t_1P_1	t_1P_1
Tax Paid by Miller	$t_2(P_2 - P_1)$	$(t_2P_2 - t_1P_1)$
Tax Paid by Baker	0	0
Total VAT	$t_1P_1 + t_2(P_2 - P_1)$	t_2P_2
Increase/Decrease	↓	↓

15

Exemption and Zero Rating

- Calculation of VAT with Zero-Rating:

If $t_1 = 0$, tax revenue:

	Subtraction Method	Credit Method
Tax Paid by Farmer	0	0
Tax Paid by Miller	$t_2(P_2 - P_1)$	$(t_2P_2 - t_1P_1) = t_2P_2$
Tax Paid by Baker	$t_3(P_3 - P_2)$	$(t_3P_3 - t_2P_2)$
Total VAT	$t_2(P_2 - P_1) + t_3(P_3 - P_2)$	t_3P_3
Increase/Decrease	↓	Neutral

16

Exemption and Zero Rating

- Calculation of VAT with Zero-Rating:

If $t_3 = 0$, tax revenue:

	Subtraction Method	Credit Method
Tax Paid by Farmer	t_1P_1	t_1P_1
Tax Paid by Miller	$t_2(P_2 - P_1)$	$(t_2P_2 - t_1P_1)$
Tax Paid by Baker	$t_3(P_3 - P_2) = 0$	$(t_3P_3 - t_2P_2) = t_2P_2$
Total VAT	$t_1P_1 + t_2(P_2 - P_1)$	0
Increase/Decrease	↓ Non Zero	Zero

17

Most Prevalent VAT System

- Consumption-Type VAT:** The tax is imposed on final consumption expenditures; gross capital expenditures are allowed to be deducted from the tax base.
- Multi-Stage Sales Tax:** The tax is imposed at every level of the production and distribution chain, unless exempted.
- Destination Principle:** The VAT based on the destination principle aims at taxing sales of goods and services for the domestic market, regardless of whether they are produced domestically or abroad. Exports are not taxed.
- Credit-Invoice Method:** Firm charges tax on its sales and receives credits for tax paid on its purchases of inputs used in the production and distribution chain, and remit the difference to the government.

18

Determination of Tax Payable (Consumption Type, Credit Method)

Taxed Supplies				Zero-Rated Supplies			
Value	Applicable Tax Rate	VAT Amount	Total Paid by Consumer	Value	Applicable Tax Rate	VAT Amount	Total Paid by Consumer
Total Sales	50,000	10%	5,000	Total Sales	50,000	0%	0
Total Expenditure	42,000		3,150	Total Expenditure	42,000		3,150
Goods for Resale	20,000	10%	2,000	Goods for Resale	20,000	10%	2,000
Capital Equipment	7,500	10%	750	Capital Equipment	7,500	10%	750
Wages & Salaries	10,000	0%	0	Wages & Salaries	10,000	0%	0
Advertising	2,500	10%	250	Advertising	2,500	10%	250
Insurance	500	0%	0	Insurance	500	0%	0
Utilities	1,500	10%	150	Utilities	1,500	10%	150
Total Tax Collected by Firm			5,000	Total Tax Collected by Firm			0
Total Input Tax Credits Available to Firm			3,150	Total Input Tax Credits Available to Firm			1,150
Net Tax Payable by Firm			1,850	Net Tax Payable by Firm			-1,150
Total Tax Collected by Government			5,000	Total Tax Collected by Government			0

Exempt Supplies			
Value	Applicable Tax Rate	VAT Amount	Total Paid by Consumer
Total Sales	51,150	N/A	0
Total Expenditure	42,000		3,150
Goods for Resale	20,000	10%	2,000
Capital Equipment	7,500	10%	750
Wages & Salaries	10,000	0%	0
Advertising	2,500	10%	250
Insurance	500	0%	0
Utilities	1,500	10%	150
Total Tax Collected by Firm			0
Total Input Tax Credits Available to Firm			0
Net Tax Payable by Firm			0
Total Tax Collected by Government			3,150

- Standard VAT Rate of 10%.
- No tax is collected from zero-rated supplies.
- The value-added in exempt supplies is not in the VAT base.

19

VAT through Supply Chain

- Furniture production and distribution with a VAT rate of 10%.

Product	Purchases (Excl. Tax)	Sales (Excl. Tax)	Value Added	Tax on Sales @ 10%	Input Tax Credit	Net Tax
Forester	Log	0	200	20	0	20
Logger/Sawmill	Timber	200	300	100	30	10
Manufacturer	Furniture	300	700	400	70	40
Wholesaler	Furniture	700	800	100	80	10
Retailer	Furniture	800	1,000	200	100	20
Total	2,000	3,000	1,000	300	200	100

- Total value-added is 1,000 and the net VAT collected is 100.

- The total net tax collected is equal to the total tax paid by the final consumer.
- The total value added is equal to the final sale price paid by the final consumer.

20

VAT through Supply Chain

- The VAT base depends on the stage of production at which the zero-rating is levied.

Product	Purchases (Excl. Tax)	Sales (Excl. Tax)	Value Added	Tax on Sales @ 10%	Input Tax Credit	Net Tax
Forester	Log	0	200	20	0	20
Logger/Sawmill	Timber	200	300	30	20	10
Manufacturer	Furniture	300	700	70	30	40
Wholesaler	Furniture	700	800	80	70	10
Retailer	Furniture	800	1,000	100	80	20
Total	2,000	3,000	1,000	200	200	0

Product	Purchases (Excl. Tax)	Sales (Excl. Tax)	Value Added	Tax on Sales @ 10%	Input Tax Credit	Net Tax
Forester	Log	0	200	0	0	0
Logger/Sawmill	Timber	200	300	0	0	0
Manufacturer	Furniture	300	700	70	0	70
Wholesaler	Furniture	700	800	80	70	10
Retailer	Furniture	800	1,000	100	80	20
Total	2,000	3,000	1,000	250	150	100

- Following the consumption/expenditure approach, what important in the VAT analysis is the information on the final consumption.

21

VAT through Supply Chain

- Similarly, the VAT base depends on the stage of production at which the exemption is given.

Product	Purchases (Excl. Tax)	Sales (Excl. Tax)	Value Added	Tax on Sales @ 10%	Input Tax Credit	Net Tax
Forester	Log	0	200	20	0	20
Logger/Sawmill	Timber	200	300	30	20	10
Manufacturer	Furniture	300	700	400	0	0
Wholesaler	Furniture	700	800	100	83	17
Retailer	Furniture	800	1,000	200	103	97
Total	2,000	3,000	1,000	236	103	133

Product	Purchases (Excl. Tax)	Sales (Excl. Tax)	Value Added	Tax on Sales @ 10%	Input Tax Credit	Net Tax
Forester	Log	0	200	0	0	0
Logger/Sawmill	Timber	200	300	0	0	0
Manufacturer	Furniture	300	700	70	0	70
Wholesaler	Furniture	700	800	80	70	10
Retailer	Furniture	800	1,000	100	80	20
Total	2,000	3,000	1,000	200	120	80

- VAT Base: Final Consumption + Exempt Business Inputs
- Value-added of the exempt sector is not in the VAT base.
- Exempt sector is the same as final consumers.

22

VAT: Some Policy Issues

- **Is VAT Regressive?** Generally an indirect tax, Yes. However, a large part of poor people typically purchased from informal sector without tax.
 - VAT revenue may be targeted to services for the poor.
 - Food may be exempt or zero-rated to reduce regressivity of VAT. Which food to exempt/zero-rated? Essentials? Unprocessed?
- **Turnover Threshold?** It is necessary to exclude some of the small traders for ease of administration. High threshold simplifies administration, but it also provides incentives for businesses to split.
- **VAT on Services?** VAT should also apply to all services defined as 'anything that is not a good' (advertising, financial, legal, medical, transport, etc.). If concession unavoidable, give exemption and not zero-rating.
 - Financial services usually exempted (EU included) as difficult to identify value added and, being internationally mobile.

23

APPLIED PUBLIC FINANCE
FOR ECONOMIC DEVELOPMENT

Duke University (USA)
Azerbaijan State Economics University
Baku, Azerbaijan
Spring 2010

Trade Taxes

Rubina Srigono (rubina.srigono@duke.edu)
DUKE CENTER FOR INTERNATIONAL DEVELOPMENT
DUKE UNIVERSITY BOX 90237, DURHAM, NC 27708-0237
TEL: +1 (919) 613-9238 ~ FAX: +1 (919) 684-2861
www.duke.edu/~dcid/



Trade Taxes

- Introduction
- Imposition of Import Tariffs: The Geometry
- Tariffs Revenue Formulas
- Effective Rate of Protection (ERP)
- Policy Implication of Trade Protection
- Non-Tariff Barriers (NTB)
- Import Duty and Other Indirect Taxes
- Export Tax
- Export Promotion—Protecting Export Sector
- Trade Taxes and Exchange Rate

Benefits from Trade

- **Global and National Benefits:**
 - Countries produce goods at which more competitive (lower cost)
 - Allocating production of particular goods to lower cost countries; trading allows overall production costs to be lower
 - International trade expands **consumption possibilities** beyond **production possibilities** of any one country
 - Trading produces win-win situation—both producer and consumer surplus gain
- **Open economies have to adjust continuously to changing competitive situation**
 - ➔ Trade policy affects directions and pace of adjustment

Importance of Trade Taxes

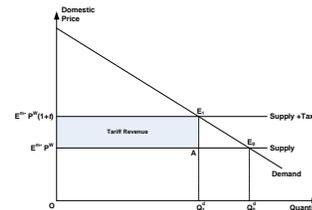
- **Good Tax Handle:** Easy Administration
- **Dual Character:** Tax and Subsidy
- **Major Economic Impacts:**
 - Foreign exchange saved, but contract trade and distort sector
- **Instrument to Induce Economic Development through Import Substitution**
- **Instrument of Trade Policy, Not Revenue Source, in Industrial Countries:**
 - Fair trade vs. Free Trade; Anti-Dumping and Countervailing Duties
 - Safeguard Measures; Labor and Environmental Standards

Trade Taxes: The Geometry

- **Assumptions:**
 - Small Country: Country is a price taker in the world market
 - Exchange rate does not vary
- **Impacts:**
 - Revenue
 - Domestic Price
 - Domestic Production, Consumption, and Imports
 - Foreign Exchange Required for Imports
 - Economic Efficiency Costs on Demand and Supply Sides

Trade Taxes: The Geometry

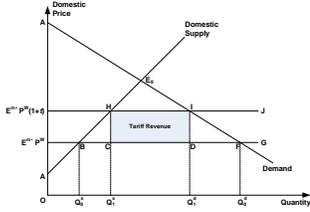
- No Domestic Production



	Without Tariff	With Tariff
Price	$P_0^d = E^m \times P^w$	$P_1^d = E^m \times P^w (1+t)$
Import Quantity	Q_1^d	Q_1^d
Tariff Revenue		$TR = t \cdot E^m \cdot P^w \cdot Q_1^d$
Excess Burden		E_1, AE_0

Trade Taxes: The Geometry

- With Competing Domestic Production



	Without Tariff	With Tariff
Price	$P_0^d = E^m \times P^w$	$P_1^d = E^m \times P^w (1+t)$
Import Quantity	$(Q_0^d - Q_0^s)$	$(Q_1^d - Q_1^s)$
Tariff Revenue		$TR = t \cdot E^m \cdot P^w \cdot (Q_1^d - Q_1^s)$
Excess Burden		$BHC + DIF$

Trade Taxes: The Geometry

- Numerical Example

World Price: $P^w = \$10$
 Tariff: $t = 10\%$

Before Tariff:

Total Demand: $Q^d = 1,000$; Domestic Production: $Q^s = 400$;
 Imports: $M = 600 = (1,000 - 400)$; $\eta = -2$; $\epsilon = 1$

After Tariff:

Percent chg in qty demanded because of tariff = $-2 \times 10\% = -20\%$

New quantity demanded = $1,000 \times (1 - 20\%) = 800$

Percent chg in qty supplied because of tariff = $1 \times 10\% = 10\%$

New quantity supplied = $400 \times (1 + 10\%) = 440$

Imports = $800 - 440 = 360$ → Tariff Revenue = $10\% \times 10 \times 360 = 360$

Trade Taxes: The Geometry

- In summary, when a tariff is imposed:
 - It raised the price paid by consumers by the amount of tax, and thus reduces consumption;
 - It enables domestic producers to produce more, as price for the taxed commodity increases;
 - Import falls, and the government collects some revenue; and
 - There is a deadweight loss to the economy.

Tariff Revenue Formulas

The demand for imports, Q_0^M , equals to the domestic demand for importables, Q_0^d , in excess of domestic supply of importable, Q_0^s

$$Q_0^M = Q_0^d - Q_0^s$$

$$\Delta Q_0^M = \Delta Q_0^d - \Delta Q_0^s$$

Using the definition of elasticity:

$$\eta^M = \eta \left(\frac{Q_0^d}{Q_0^M} \right) - \epsilon \left(\frac{Q_0^s}{Q_0^M} \right)$$

where:

$$\eta^M : \text{Demand elasticity of imports} = \frac{\Delta Q_0^M}{Q_0^M} \div \frac{\Delta P}{P_0}$$

$$\eta : \text{Price elasticity of demand} = \frac{\Delta Q_0^d}{Q_0^d} \div \frac{\Delta P}{P_0}$$

$$\epsilon : \text{Price elasticity of domestic supply} = \frac{\Delta Q_0^s}{Q_0^s} \div \frac{\Delta P}{P_0}$$

→ The demand elasticity of imports is always greater than the demand elasticity for importables in absolute terms.

Tariff Revenue Formulas

Specific (Unit) Tariff

From the derivation of excise tax revenue formulas, when a specific tax is imposed, the total revenue can be calculated by:

$$TR = TQ_0 + T^2 \frac{Q_0}{P_0} \left(\frac{\epsilon \eta}{\epsilon - \eta} \right)$$

When supply is infinitely elastic, as in the case of importables, then

$$TR = TQ_0 + T^2 \frac{Q_0}{P_0} \eta$$

Case 1: No Domestic Production

$$TR = TQ_0^d + T^2 \frac{Q_0^d}{P_0^d} \eta$$

where Q_0^d is the total demand for importables, and P_0^d is the import price in domestic currency, including cost, insurance, and freight (c.i.f.).

Tariff Revenue Formulas

Specific (Unit) Tariff

Case 2: With Competing Domestic Production

The total tariff revenue can be calculated in two steps:

- The first step is to calculate the **gross** tariff revenue provided the total demand were met only by imports. That is,

$$TR^G = TQ_0^d + T^2 \frac{Q_0^d}{P_0^d} \eta$$

- The second step is to calculate that the tariff revenue would have been collected if the domestic supply were subject to tariff. That is,

$$TR^S = TQ_0^s + T^2 \frac{Q_0^s}{P_0^s} \epsilon$$

Thus, the actual tariff revenue can be calculated by subtracting TR^S from TR^G :

$$TR = T(Q_0^d - Q_0^s) + \frac{T^2}{P_0^d} (\eta \cdot Q_0^d - \epsilon \cdot Q_0^s)$$

Using the demand elasticity of imports formula, the above equation can be reduced to:

$$TR = TQ_0^M + T^2 \frac{Q_0^M}{P_0^M} \eta^M$$

Tariff Revenue Formulas

Ad Valorem Tariff

From the derivation of excise tax revenue formulas, when an *ad valorem* tax is imposed, the total revenue can be calculated by:

$$R = tP_0Q_0 + t^2P_0Q_0 \left[\frac{(\varepsilon + 1)\eta}{\varepsilon - \eta(1+t)} \right]$$

When supply is infinitely elastic, as in the case of importables, then

$$R = tP_0Q_0 + t^2P_0Q_0\eta$$

Case 1: No Domestic Production

$$TR = t P_0^{cif} Q_0^d + t^2 P_0^{cif} Q_0^d \eta$$

Case 2: With Competing Domestic Production

$$TR = t P_0^{cif} Q_0^M + t^2 P_0^{cif} Q_0^M \eta^M$$

Tariff Revenue Formulas

Illustration

Taxmekistan produces \$20 million of spirits and also imports \$80 million. Suppose that own-price elasticity of demand for spirits is -1 , and the local supply elasticity is 0.8 . How much revenue would the government collect if a tariff rate of 25% is imposed?

Answer:

Demand elasticity of imports:

$$\begin{aligned} \eta^M &= \eta \left(Q_0^d / Q_0^M \right) - \varepsilon \left(Q_0^s / Q_0^M \right) \\ &= -1 [(80 + 20)/80] - 0.8 [20/80] = -1.45 \end{aligned}$$

Estimated tariff revenue:

$$\begin{aligned} TR &= t P_0^{cif} Q_0^M + t^2 P_0^{cif} Q_0^M \eta^M \\ &= 25\% \times 80 + (25\%)^2 \times 80 \times (-1.45) = \$12.75 \text{ million} \end{aligned}$$

Trade Protection

- **Nominal Protection**
- **Effective Protection**

Generally, tariffs are not only imposed on the imported final goods, but also on the imported inputs or raw materials used in domestic production of that good

→ The effective or actual protection enjoyed by domestic producers different from the nominal protection

- **Effective Rate of Protection (ERP) is defined as:**

$$ERP = \frac{\text{Change in Value Added Due to Tariff}}{\text{Original Value Added w/o Tariff}}$$

Effective Rate of Protection (ERP)

- **Original Value Added**—is calculated either at world prices (without tariff) or at domestic prices (including tariffs). Thus,

- **ERP at World Prices:**

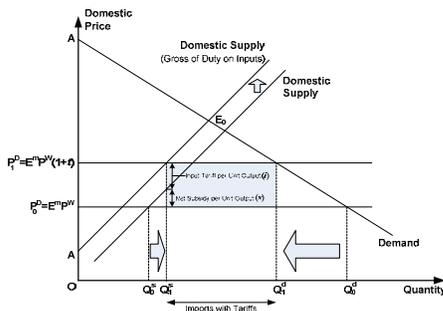
$$ERP^W = \frac{\text{Value Added w/ Tariff} - \text{Value Added w/o Tariff}}{\text{Value Added w/o Tariff at World Prices}} = \frac{VA^P - VA^W}{VA^W}$$

- **ERP at Domestic Prices**

$$ERP^D = \frac{\text{Value Added w/ Tariff} - \text{Value Added w/o Tariff}}{\text{Value Added with Tariff at Domestic Prices}} = \frac{VA^P - VA^D}{VA^D}$$

Effective Rate of Protection (ERP)

- **Import Duty of Outputs (Final Goods) and Inputs**



Effective Rate of Protection (ERP)

- **Nominal Subsidy Rate:**

$$\frac{t^{output} \times P^W}{P^W} = t^{output}$$

- **Effective Subsidy Rate:**

$$t^{output} - \alpha \cdot t^{input}$$

where α = share of input costs subject to import duty

- **Effective Subsidy Rate per Unit** (see previous diagram)

$$s = t^{output} (E \cdot P^W) - \alpha \cdot t^{input} (E \cdot P^W) = t^{output} (E \cdot P^W) - i$$

Note: Effective subsidy is the numerator of ERP, that is, (VA at protected product prices, or domestic protected prices) **minus** (VA of product at world prices)

Effective Rate of Protection (ERP)

Numerical Illustration:

	CASE I	CASE II	CASE III
Output Tariff Rate (t_o)	0%	40%	40%
Input Tariff Rate (t_i)	0%	0%	40%
Sales Price	100	140	140
Traded Input	50	50	70
Non-Traded Input	10	10	10
VA^W	$100 - 60 = 40$	$100 - 60 = 40$	$100 - 60 = 40$
VA^D	$100 - 60 = 40$	$140 - 60 = 80$	$140 - 80 = 60$
$VA^D - VA^W$	0	40	20
Effective Subsidy	0	40	20
ERP^W	0%	100%	50%
ERP^D	0%	50%	33%

Effective Rate of Protection (ERP)

Zero and Negative ERP:

What tariff t_j on the traded inputs will reduce ERPW to zero, if t_i is 40% (same prices and costs as previous example)

$$VA^D = 100 \times (1 + 40\%) - 50 \times (1 + t_j) - 10 = 130 - 50 \times (1 + t_j)$$

$$VA^W = 100 - 50 - 10 = 40$$

$$ERP^W = \frac{130 - 50 \times (1 + t_j) - 40}{40} = 0 \rightarrow t_j = \frac{40}{50} = 80\%$$

ERP will be negative if the tariff on traded inputs is greater than 80%.

Policy Implication of Trade Protection

- When tariff protection is given to domestic producers:
 - Output price goes up and thereby value added increases
 - Earnings of labor and capital in the protected sector goes up
 - Businesses **reallocate resources to protected sector from other sectors**
- Subsidy to domestic producers would cause the same impact
 - Effective protection means a subsidy to domestic producers of that sector
- Incentive for **high cost resources to move to protected sector**, introducing distortions among domestic industries
 - Inefficient as the economy is employing its high cost resources to produce something that may be procured at lower cost from the world market
 - Scarce labor/capital could have been more productive in other sector

Policy Implication of Trade Protection

- An expansion of the protected industry hurts the poor if the protected sector is the market of **luxuries or is capital intensive in a labor rich economy**
- If the protection continue for long, the domestic industry tend to become inefficient
 - When ERP is zero, the industry works more efficiently, economize on costs, and also use their by-products
- With a uniform tariff rate, still there is a distortion between the taxed and non-taxed sectors of the economy, but no distortion among the uniformly taxed industries
 - Uniform tariff less distortionary

Policy Implication of Trade Protection

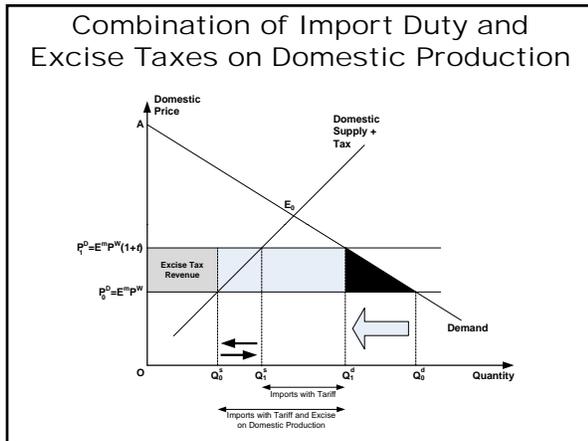
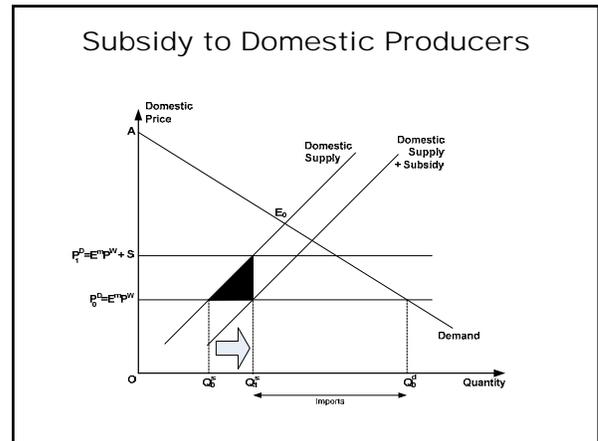
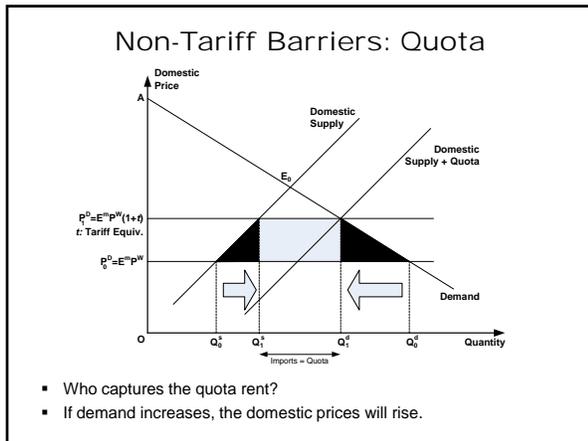
- Infant industry** argument used to provide protection to the domestic industry: **import substitution strategies**
 - Adopt new technologies and management techniques, train labor, etc. such that unit costs drop and protection can be removed over transitional period
 - However, once protection is in place, it is difficult to withdraw it
 - Infants grow up to become effective lobbyists for continuing protection—more cost effective to invest in lobbying than new equipment and train labor; unborn industries have no lobby groups
- Infant industry strategy also fails if international competition lowers unit costs faster than domestic infant industry becomes more competitive

Non-Tariff Barriers

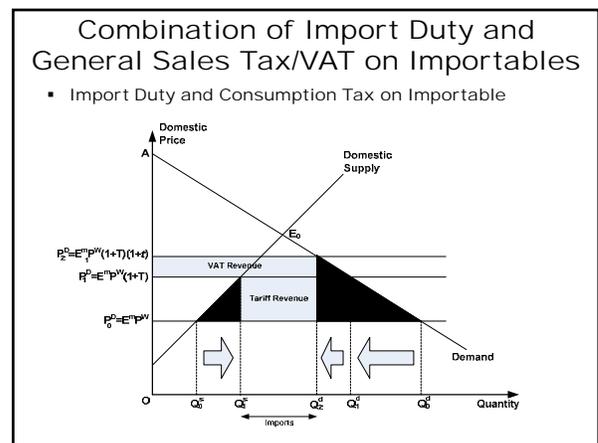
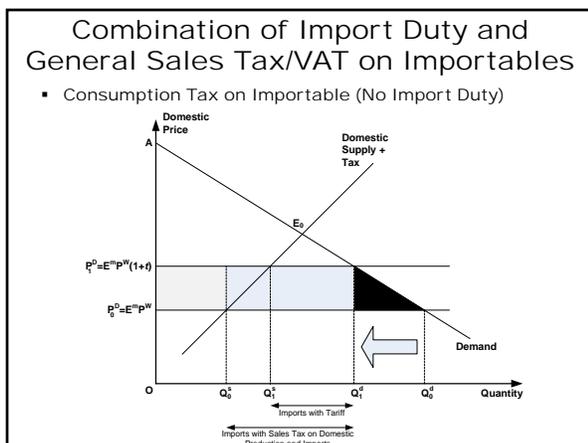
Trade protections can be achieved through non-tariff barriers (NTBs):

- Import Quotas: Tradable or Auctioned
- Subsidy to Domestic Producers
- Foreign Exchange Allocation
- Health / Safety / Environmental / National Security Standards

→ World trade and welfare are contracted by NTBs

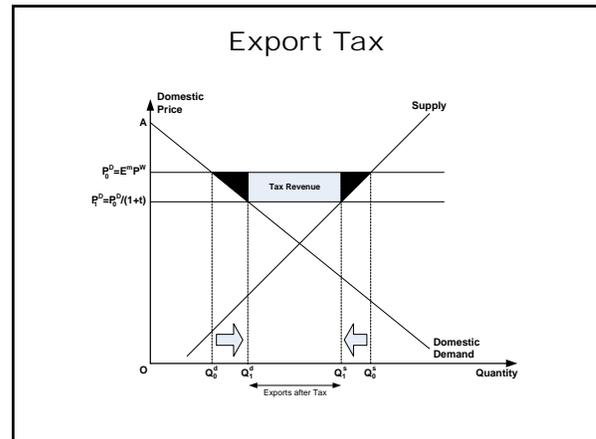


- ### Combination of Import Duty and Excise Taxes on Domestic Production
- **Combined impact of a tariff on imports and an equal excise tax on domestic production:**
 - Price up, no protection to domestic producers
 - Total consumption decreases
 - No change in domestic production
 - Imports decline, but not to the extent of tariff
 - Foreign exchange savings, but not to the extent of tariff
 - More revenues to government
 - Lower efficiency costs / dead weight loss
 - Consumers lose, producers do not gain, government gains more



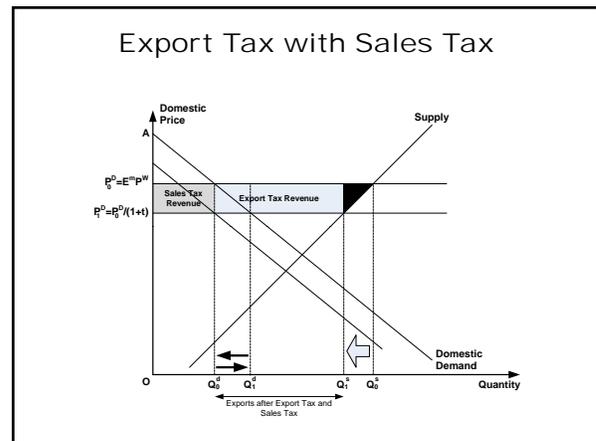
Export Tax

- **Export tax is less common and typically used to tax primary goods and natural resources (agriculture, forestry, mining sector)**
- **Impact:**
 - Domestic price falls
 - Domestic production goes down
 - Domestic consumption increases
 - Exports decline
 - Less foreign exchange earnings
 - Government earns tax revenue
 - Dead weight loss on both supply and demand sides
 - Consumers gain, producers lose (consumers are protected in a way)



Export Tax vs. Import Duty

- **Import Duty:**
 - Raises domestic price of competing imports—**provides effective subsidy to domestic producers**
 - Used to protect domestic outputs or products (final or other intermediate domestic products)
- **Export Tax:**
 - Lower domestic price of competing export—**provides effective subsidy to domestic users**
 - Used to protect domestic intermediate products by lowering price of materials or inputs (e.g., leather products are protected by export tax on hides and skins, construction industry is protected by export tax on cements)



Export Promotion: Export Platforms and Preferential Trade Agreement

- **High-Cost Protected Economies:** Trade taxes and overvalued exchange rates in domestic economy restrict trade and foreign investment by raising the costs of production and trade directly and indirectly. Specifically, **tariffs can result in negative protection for export industries.**
 - This discourages export business in domestic economy generally
- **Restricted Access to International Markets:** Tariff and non-tariff barriers in trading partner countries restrict access to markets and, hence, smaller markets, lower scales of production, and degrees of specialization that are feasible in domestic market.
 - Export-oriented investments in an increasingly globalized market seek regional or global production and sales opportunities

Export Promotion: Export Platforms and Preferential Trade Agreement

- **Foot-Loose Manufacturing:** There is range of internationally mobile (or foot-loose), labor-intensive industries such as clothing, foot wear and other light assembling (low capital costs and low transportation costs) that seek lowest cost manufacturing platforms
 - Raw materials and products can be moved quickly and cheaply to and from lowest cost manufacturing site
 - Contract manufacturing is common mode of operation

Export Promotion: Strategies to Remove Negative Protection

- **Lower Import and Export Duty Rates**
- **Dedicated Export Platforms**
 - Export Processing Zones
 - Manufacturing under Bonds for Exports

Capital investments are given special treatment under customs and income tax plus possible exemptions on other license fees, etc. These tax breaks are not available to domestic businesses competing in same sector; therefore, typically limitations or penalties (over and above normal duties and taxes) are placed on sales into domestic market

- **Flexible Export Platforms**
 - Duty Draw Back
 - Duty Exemption

Trade Taxes and Exchange Rate

- **Exchange rate is the price of a foreign currency**

$$\text{Exchange Rate} = \frac{\text{Number of Domestic Currency (D\$)}}{\text{Number of Foreign Currency (F\$)}}$$

- **What determine exchange rate?**
 - Demand and supply of foreign currency
 - Demand for F\$ to pay for imports of goods and services
 - If exchange rate increases, demand for foreign exchange decreases as demand for imports decreases
 - Supply for foreign exchange comes from F\$ receipts from exporters, net transfers, net factor receipts, and net capital inflows
 - If exchange rate increases, exports increases

Implications of Import Duty on Exchange Rate

- Previously, import price is assumed constant in D\$. While world price in F\$ constant, exchange rate can be affected by taxes.
- **When a tariff introduced on imports**, demand of both imports and foreign exchange decreases, price of foreign currency declines and **domestic currency appreciates**.
- **Some Implications:**
 - Importers pay less to foreign suppliers for each unit of foreign currency because of appreciation of the domestic currency, but they also pay a tariff, so they are worse off.
 - Less goods imported; foreign exchange saved
 - Exporters receive less for each unit of foreign currency and supply of foreign exchange declines
 - Sectors that benefit from import tariff: government (tax revenue), domestic producers of importables (protection), domestic consumers of exportable goods (lower prices).

Implications of Export Tax on Exchange Rate

- With an **export tax**, the supply of foreign exchange decreases, market exchange rate increases and **domestic currency depreciates**.
- **Some Implications:**
 - Domestic currency appreciates
 - Less goods exported; supply of foreign exchange declines
 - Exporters benefit from currency depreciation, but pay export tax
 - Importers hurt (Lerner's Symmetry) because of currency depreciation—have to pay more domestic currency
 - Sectors that benefit from import tariff: government (tax revenue), domestic producers of importables (higher production), domestic consumers of exportable goods (lower prices).

APPLIED PUBLIC FINANCE FOR ECONOMIC DEVELOPMENT

Duke University (USA)
Azerbaijan State Economics University
Baku, Azerbaijan
Spring 2010

Personal Income Tax

Rubina Sigmund (rubina.sigmund@duke.edu)
DUKE CENTER FOR INTERNATIONAL DEVELOPMENT
DUKE UNIVERSITY BOX 90237, DURHAM, NC 27708-0237
TEL: +1 (919) 613-9228 ~ FAX: +1 (919) 684-2861
www.duke.edu/~dcid/



Personal Income Tax

- Personal Income Tax (PIT): Introduction
- Definition of Income
- Definition of Taxpayers: Source vs. Residence Principle
- Typical Basic Structure of Personal Income Tax
- Problems in Measurement of Income
- Special Types of Incomes and Deductions
- Calculation of Income Tax Liability: Average vs. Marginal Tax Rate
- Tax Rates: Graduated vs. Flat Tax
- Impact of PIT on Economic Activities: Income and Substitution Effect

Personal Income Tax: Introduction

- **Direct Income Taxes** (including payroll taxes), particularly taxes on employment income, is major source of revenues in industrial countries
 - Also important in low income countries, but they rely more on indirect taxes
- Income taxes have the potential to yield substantial and elastic revenues if rapid growth and real wage rates are rising
 - Stability of tax revenues creates an appropriate investment climate
- It is a **complex** tax in that it demands accounting for income from many different sources (employment, fringe benefits, self-employment, business activities in many sectors and undertaken through many types of legal entity or association)

Personal Income Tax: Introduction

- As a direct tax it allows aggregation of income earned by an individual
 - This allows **progressive tax rate structures** to apply to aggregate income—major attraction of income taxes
- Could income tax improve the income distribution in the economy?

Definition of Income

- Standard definition of income of a person—the so called **Haig-Simons (H-S) Definition**:
"Income is the money value of the net increase in an individual's power to consume in a period"
INCOME = CONSUMPTION + CHANGE IN ACCUM. WEALTH (NET WORTH)
- This is the definition from the use side:
Current Consumption + Savings (or Future/Potential Consumption) (or Change in Net Assets)

Definition of Income

- Illustration of H-S Definition:
 - Bank account beginning balance: \$1,000
 - Consumption during the year: \$15,000
 - Bank account balance at year end: \$2,000**INCOME = \$15,000 + (\$2,000 - \$1,000) = \$16,000**
- Income tax puts a tax on accumulation of capital assets which could have an impact on economic growth

Definition of Income

- The **source** side definition of income:

Income of a Person

- = **Labor Income** (employment income, including fringe benefits, self-employment income)
- + **Capital Income** (Profits, Dividends, Rents, Interests, Royalties)
- + **Net Transfers** (from Other Individuals, Government, Foreigners, including Gifts, Alimony, etc.)
- + **Change in Value of Existing Assets** (Accrued Capital Gains/ Losses in the Period)

Definition of Taxpayers: Residence vs. Source Principle

- All countries tax income **sourced in their jurisdiction of territory** by declaration of income by residents and withholding on non-residents (**source-based or territorial tax**)
- Under the **residence-based principle**, individuals or legal entities are taxable in the jurisdiction in which they establish their residence or domicile regardless of the source of income → Taxes residents' **world-wide income**.
 - Some countries expand declaration of income by residents to include income from all jurisdictions (**residence-based world-wide income tax**)
 - **Outward investment neutrality** (similar to origin principle in consumption tax)
 - Resident individuals are typically in the jurisdiction more than 6 months during the fiscal year, or based on the economic ties
 - Citizens of the jurisdiction (as in the U.S.)

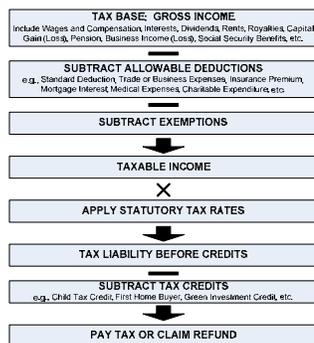
Definition of Taxpayers: Residence vs. Source Principle

- The **source-based or territorial principle** recognizes the prior or sole claim of the source country i.e. the country in which the income arises to the natural or legal persons., to tax such income without reference to physical presence or legal residence; taxes income produced by all domestic factors
 - **Inward Investment Neutrality** (similar to destination principle for consumption tax): Treat all investment and productive income in a territory the same, domestic or foreign.
 - Foreign investors need double taxation treaties in home country to avoid double taxation.
- In practice, countries apply a **mix of residence-and-source based taxation**—the former for nationals of the country and the latter for income earned within the country by non-residents or non-natural persons.

Definition of Taxpayers: Residence vs. Source Principle

- The precise nature of the mix depends upon the relative importance given by the taxing jurisdiction to attracting FDI, revenue implications and the administrative capacity
 - For **developing countries**, the administrative capacity becomes a limiting factor and they sometimes forego taxing of foreign income of residents primarily on grounds of administrative expediency (or level of income involved is modest)
 - On the other hand, while taxing the domestic source income of foreigners, the trade-off between revenue needs and the resulting disincentive becomes important
 - For **developed countries**, the main concern is taxing world wide income of residents while continuing to tax domestic source income of non-residents

Typical Basic Structure of Personal Income Tax



Problems in Measurement of Income

- **Fringe Benefits of Employment**, especially in-kind benefits
- **Cost of Doing Business**: Cost of Earning Income Subtracted from Gross Income
 - Self Employed: Problem of distinguishing between business and personal use of houses, vehicles, computers, farm, etc.
 - Capital and current costs of earning income has many issues of market valuation of assets used and withdrawals from inventories, etc.
- **Accrued Capital Gains**—difficult in getting opening and closing market prices
- **Imputed Income**—market rent of owner occupied housing
- **In Kind Services**—e.g., housecleaning, child care, etc.
- **Difficult to Measure Sectors**—rental property, agriculture/farm income, life insurance → Dealt with **schedular taxation**

Special Types of Incomes and Deductions

- **Interest on Local Government Bonds**—interest income from local government bonds often exempt from central/federal government income tax. This is effectively a transfer from central/federal government to local government.
- **Social Security/Pension**—if contributions to social security or pension are tax exempt, their benefits (realization) should be taxed. On the other hand, if social security/pension contributions are not deducted from taxable income, later benefit should be excluded.
- **Some Tax Relief**—alimony paid; mortgage interest; medical and dental expenses; casualty and losses; personal and family allowances (or tax credit); credit from taxes paid in other countries on foreign source income subject to domestic income tax.

Special Types of Incomes and Deductions

- **Change in Accumulated Wealth**—appreciation in value of assets with time needs to be included in income. Two ways of calculation: (a) **accrual basis** (every year); or (b) **realization basis** (sales or transfer).
 - The latter is more practical, but the issue of pushing income into higher tax bracket and of locking up capital (for owner) and revenue (for government)
 - Problem with timing of losses and gains
- **Average the income over the asset's life**; or
 → **Use low rate of tax, or no tax at all**

Calculation of Income Tax Liability: Marginal vs. Average Tax Rate

- Tax Liability in the Presence of a Deduction or Allowance
- Assume the following tax brackets:

Taxable Income (\$)	Tax Rate
Below 5,000	10%
5,000 – 10,000	15%
Over 10,000	20%

- Suppose:

Gross Income: **\$19,000**
 Standard Deduction: **\$2,000**
 Taxable Income: **\$17,000**

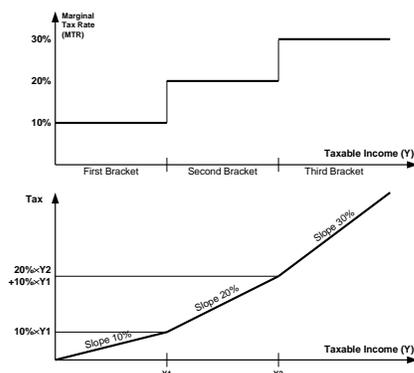
Calculation of Income Tax Liability: Marginal vs. Average Tax Rate

Taxable Income: \$17,000
 Income Tax on the First \$5,000: $10\% \times 5,000 =$ **\$500**
 Income Tax on the Next \$5,000: $15\% \times 5,000 =$ **\$750**
 Income Tax on the Last \$7,000: $20\% \times 7,000 =$ **\$1,400**
Total Tax Liability: $(500 + 750 + 1,400) =$ \$2,650

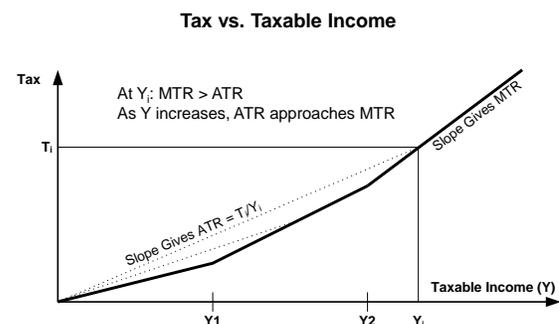
- **Marginal Tax Rate (MTR):** 20%
- **Average Tax Rate (ATR):** $2,650 \div 17,000 = 13.94\%$

- **Horizontal Equity:** People with the same level of income pay the same amount of taxes
- **Vertical Equity:** Tax liability increases with an increase in income level

Marginal vs. Average Tax Rate



Marginal vs. Average Tax Rate



Income Deduction vs. Tax Credit

- Deduction leads to a violation of vertical equity, it may be better to give a tax credit
- Assume the following tax brackets:

Taxable Income (\$)	Tax Rate
Below 5,000	10%
5,000 – 10,000	15%
10,000 – 20,000	20%
Over 20,000	25%

- Suppose:

Person A Annual Income: \$8,000
Person B Annual Income: \$15,000

Income Deduction vs. Tax Credit

- **With no Exemptions or Allowances:**

Suppose: **Person A Annual Income: \$8,000**
Person B Annual Income: \$15,000

	Person A	Person B
Taxable Income:	\$8,000	\$15,000
Tax on the First Bracket @ 10%	\$500	\$500
Tax on the Second Bracket @ 15%	\$450	\$750
Tax on the Third Bracket @ 20%	-	\$1,000
Tax on the Last Bracket @ 25%	-	-
Total Tax Liability:	\$950	\$2,250
Average Tax Rate (ATR):	11.88%	15.00%

Income Deduction vs. Tax Credit

- **With \$2,000 of Income Deduction:**

	Person A	Person B
Taxable Income:	\$6,000	\$13,000
Tax on the First Bracket @ 10%	\$500	\$500
Tax on the Second Bracket @ 15%	\$150	\$750
Tax on the Third Bracket @ 20%	-	\$600
Tax on the Last Bracket @ 25%	-	-
Total Tax Liability:	\$650	\$1,850
Average Tax Rate (ATR):	8.13%	12.33%
Tax Savings:	\$300	\$400

- Due to income deduction, the reduction in income tax liability is \$300 for Person A and \$400 for Person B. This violates the vertical equity principle. Why does it occur?

Global vs. Schedular Income Tax System

- **Global Income Tax System**—Same tax rate used to calculate the tax liability for income from different sources
 - Promotes vertical equity
 - Requires more sophisticated tax administration
- **Schedular System**—Different tax rates used for incomes from different sources (wages, interest, dividend, rents)
 - Maybe easier to administer by withholding at source
 - Different treatment of different types of income may provide incentives for stimulating economic growth in some sectors or deal with difficulties in measuring component of income (capital gain on land)
- Most countries have opted for global system. However, they maintain some features of schedular system, e.g. taxing interest income and capital gains at lower rates.

How Many Tax Brackets? Flat Tax?

- High number of rate brackets adds to complexity without adding much to revenues or progressivity
 - Many countries have reduced number of brackets to 3 to 5 positive rates aside from “zero bracket” or initial minimum amount of tax free income
- What is minimum number of brackets for progressivity? **Two**
 - “Flat tax” structure typically means a large “zero bracket” and one positive rate
- Two critical design issues:
 - **Zero bracket size? What is minimum taxable amount?**
 - **Top rate and income level at which top rate starts?**

How Many Tax Brackets? Flat Tax?

- To answer these questions, we need to know income distribution in country to set tax rate structure
 - Income distributions are typically skewed to right (log-normal distributions)
 - For example, bottom 40% earn 10% to 15% of income and top 20% earns about 50% of income
- **Bulk of tax revenue typically derived from top income earners:** 60% to 80% of tax revenue can come from top 20% of earners with a progressive tax structure
 - Tax revenues are sensitive to top rate and starting income
- Flat taxes are typically structured as large standard deduction or zero rate bracket plus one tax rate on all income in excess of the large bracket
 - Tax rate is typically set at some intermediate rate, say 20%, rather than rising MTR from low to high rates

Flat Tax

ADVANTAGES	DISADVANTAGES
<ul style="list-style-type: none"> - Simpler structure reduces compliance and administrative costs - Lower top MTR encourages compliance and reduces supply side disincentives - Large standard deduction reduces number of tax filers lowering compliance and administrative costs - Retains some progressivity as ATR rises for those above standard deduction 	<ul style="list-style-type: none"> - Less Progressive - Loses revenue potential with high income earners - Puts higher burden on middle income earners - Requires administrative capacity to check when income rises above standard deduction or businesses are hiding in underground economy

- Attractive structure in economies with poor compliance record and/or trying to simplify complex tax system with high rates and many tax breaks. Successfully used in Russia, former Soviet States, Egypt, etc.

Economic Impacts of PIT

- **Income Tax and Supply of Labor**
 - Income Effect: PIT makes individual worse off. Thus, the individual has to work harder and make up for the lost income
 - Substitution Effect: PIT reduces the return to labor per unit of time. Thus, the opportunity cost of "not-working" (leisure) is now less. Assuming leisure is a normal good, lower price should increase consumption.
 - The two effects go in **opposite directions** and the final outcome is indeterminate
- Increase in income MTR typically do not change the supply of labor of formal or modern sector full-time employees
 - Tax free bracket and low rates protect low-wage employees, but social security payroll taxes can affect low income worker choices

Economic Impacts of PIT

- Income ATR can have effects on larger or long-term choices in the labor market:
 - Decision to work or not: How long to work over a life time?
 - Choices of type of job in terms of stability of income from year to year (income averaging over the years to smooth tax rates)
 - Choice of location if ATR on income differs across locations
 - Choice of entering formal sector versus informal: Choice of net-of-ATR income in formal sector versus tax-free income in informal sector.
 - In the case of social security, choice of net of tax income plus benefits (if earned through working) versus tax free income and no (or lower) benefits

Economic Impacts of PIT

- **Income Tax and Supply of Savings**
The effect of taxation on the supply of savings is rather involved. However, the same framework may be use to analyze it.
- ➔ **Individual consumes part of the income and saves for future consumption**
- **Tax Only on Wage Income**—the income available for both current (C_p) and future (C_f) consumption is lower.
- **Tax on Wage and Savings Income**—the return from savings decline and the total income goes down.
 - Income Effect: Both current (C_p) and future (C_f) consumption is lower.
 - Substitution Effect: The relative price of future consumption rises. Thus, savings become more expensive.
 - The two effects go in the **same direction**

Economic Impacts of PIT

- **Effect of Income Tax on Risk Taking**
Occupations or investment projects with highly variable income from year to year can be subjected to high MTR in good years (e.g., painter, author, independent consultant, etc.).

Thus, ATR is higher than if the income was earned in a stable stream over the years

- **Example:**
Suppose the tax rate structure is graduated as follows:

Taxable Income (\$)	Tax Rate
Below 5,000	10%
5,000 – 10,000	15%
Over 10,000	20%

Economic Impacts of PIT

- **Effect of Income Tax on Risk Taking:**
Suppose: **Person A** Annual Income: **\$10,000** for 20 years
Person B Annual Income: **\$20,000** for 10 years

	Person A	Person B
Taxable Income:	\$10,000	\$20,000
Tax on the First Bracket @ 10%	\$500	\$500
Tax on the Second Bracket @ 15%	\$750	\$750
Tax on the Third Bracket @ 20%	-	\$2,000
Total Tax Liability:	\$1,250	\$3,250
Total Lifetime Tax:	\$25,000	\$32,500

- ➔ **Income Averaging, Lower Tax Rate, Tax Compensation**

APPLIED PUBLIC FINANCE FOR ECONOMIC DEVELOPMENT

Duke University (USA)
Azerbaijan State Economics University
Baku, Azerbaijan
Spring 2010

Corporate Income Tax

Rubina Sigmund (rubina.sigmund@duke.edu)
DUKE CENTER FOR INTERNATIONAL DEVELOPMENT
DUKE UNIVERSITY BOX 90237, DURHAM, NC 27708-0237
TEL: +1 (919) 613-9228 ~ FAX: +1 (919) 684-2861
www.duke.edu/~dcid/



Corporate Income Tax

- Introduction: Why Tax Corporations?
- Definition of Taxable Income
- Cost of Goods Sold
- Depreciation Allowance and Methods
- Financing Costs: Debt and Equity
- Overheads
- Capital Gains Tax
- Treatment of Losses
- Tax Integration

Why Tax Corporations?

- **Why not just tax the income of the corporation owners via the personal income tax?**
 - Corporations, especially the big ones, really are distinct entities; large corporations have thousands of stockholders, and the managers of such corporations are controlled very loosely
 - Corporation receives a number of special privileges from society, i.e., limited liability of stockholders
 - Protects the integrity of the personal income tax; in the absence of a corporation tax, retained earnings creates no tax liability

Definition of Income

- **Corporations and their taxation of treated as legal entities separate from their owners**
 - There is an issue of integration of corporate and personal income
- Using the same standard definition of income of a person:
INCOME = CONSUMPTION + CHANGE IN ACCUM. WEALTH (NET WORTH)
 - **Consumption:** Payment of Dividends
 - **Change in Net Worth:** Retained Earnings + Capital Gains/Losses on Assets and Liabilities
- Retained earnings are future investments. The future income from these investments may increase the value of the shares of the corporation.

Definition of Income

- In practice, income is defined from the **source side** in terms of revenues earned **less** the costs of earning income **plus** capital gains/losses
- Tax Base or Taxable Income is calculated by subtracting most items related to costs of earning income from revenues (sales)
- Generally,
TAXABLE INCOME = SALES
 - COST OF GOODS SOLD
 - DEPRECIATION ALLOWANCE
 - FINANCING COSTS
 - OVERHEADS

Cost of Goods Sold

- Cost of Goods Sold (COGS) is an issue of inventory valuation. If prices are changing with time (real or inflationary), method for calculating COGS must be specified to define costs of item withdrawn from inventory to make sale.
- Methods normally used:
 - **First In First Out (FIFO):** the oldest inventory taken as the COGS
 - **Last In First Out (LIFO):** the last items purchased is the COGS
 - **Average Cost**

Cost of Goods Sold

▪ **Illustration: No Change in Price**

Corp. Income Tax Rate: 40%
Change in Price (Annual): 0%

YEAR	0	1	2	3
Sales		200.00	200.00	200.00
Purchases	100.00	100.00	100.00	
COGS		100.00	100.00	100.00
Taxable Income		100.00	100.00	100.00
Tax Liability (Nominal)		40.00	40.00	40.00
Tax Liability (Real)		40.00	40.00	40.00
PV @ 8% Disc. Rate		37.04	34.29	31.75
Total PV of Tax Liability	103.08			

Cost of Goods Sold

▪ **Illustration: First In First Out (FIFO)**

Corp. Income Tax Rate: 40%
Change in Price (Annual): 10%

YEAR	0	1	2	3
Sales		220.00	242.00	266.20
Purchases	100.00	110.00	121.00	
COGS		100.00	110.00	121.00
Taxable Income		120.00	132.00	145.20
Tax Liability (Nominal)		48.00	52.80	58.08
Tax Liability (Real)		43.64	43.64	43.64
PV @ 8% Disc. Rate		40.40	37.41	34.64
Total PV of Tax Liability	112.46			

Cost of Goods Sold

▪ **Illustration: Last In First Out (LIFO)**

Corp. Income Tax Rate: 40%
Change in Price (Annual): 10%

YEAR	0	1	2	3
Sales		220.00	242.00	266.20
Purchases	100.00	110.00	121.00	
COGS		110.00	121.00	100.00
Taxable Income		110.00	121.00	166.20
Tax Liability (Nominal)		44.00	48.40	66.48
Tax Liability (Real)		40.00	40.00	49.95
PV @ 8% Disc. Rate		37.04	34.29	39.65
Total PV of Tax Liability	110.98			

- ### Cost of Goods Sold
- With **FIFO**, companies pay more taxes as they use old prices in the costs. Timing of payment is important.
 - With **LIFO**, tax liability is low in initial years. Tax liability is high in the last year, when the company may be closing down because of bad times or poor business.
 - LIFO accentuates cycles—taxes relatively higher in downturns when the company draw down inventories.
 - In most countries, a corporation is allowed to choose either FIFO or LIFO; some restrict to FIFO.
 - LIFO is desirable in high inflation economies
 - FIFO is desirable in low inflation economies to avoid high taxes in cyclical downturns
 - Sometimes a mixture may be used—average cost method.

- ### Depreciation Allowance
- **Depreciation (Capital Consumption) Allowance**—reflects the wear and tear of capital (e.g., plants, machinery, building) during production process and is therefore a cost of earning income
 - Ideally, it should be **economic depreciation**. However, it is difficult to determine, especially if the company uses a large number of machinery and equipment.
 - It also requires price adjustments to current level rather than historical cost base
 - Four methods often used:
 - Straight Line Depreciation
 - Declining Balance
 - Immediate Expensing
 - At Loss or Realization

- ### Depreciation Methods
- **Straight Line Method**—based on the historical cost of the asset, life of the asset, and the estimated salvaged value
 - A uniform annual rate depreciation
 - Often used for large, long-lived assets, such as buildings
 - Requires asset-by-asset depreciation accounts
 - **Annual Depreciation:** $D = (C - SV)/n$
 - Where: C = Historical Cost
 - SV = Salvage Value
 - n = Life of Asset

Depreciation Methods

▪ **Straight Line Method:**

Illustration:

Taxable Income before Depreciation	\$100
Cost of Asset Purchased in Year 1	\$90
Life of Asset (Years)	3

YEAR	1	2	3
Taxable Income before Depreciation	100.00	100.00	100.00
Depreciation Allowance	30.00	30.00	30.00
Taxable Income	70.00	70.00	70.00
Tax Liability	28.00	28.00	28.00
PV @ 10% Disc. Rate	25.45	23.14	21.04
Total PV of Tax Liability	69.63		

Depreciation Methods

▪ **Declining Balance Method**—Provides an allowance equal to constant proportion of the outstanding un-depreciated balance of assets

- Studies show that economic depreciation follows declining balance
- Allow pooling of all assets in same depreciation rate class rather than asset-by-asset depreciation accounts.
 - *New purchases in asset class added to pool, sales of assets subtracted from pool*
 - *Depreciation rate for class of assets applied to pool*
- Simplification makes pooled declining balance popular tax reform measure

Depreciation Methods

▪ **Declining Balance Method**

- **Annual Depreciation:** $D = C \times d$ → in the first year
 $D = C(1 - d) \times d$ → in the second year
 $D = C(1 - d)^2 \times d$ → in the third year, ...

Where: C = Historical Cost; d = Depreciation Rate

- For economic life of asset of n years, set $d = 2/n$

YEAR	1	2	3
Taxable Income before Depreciation	100.00	100.00	100.00
Depreciation Allowance	60.00	20.00	6.67
Taxable Income	40.00	80.00	93.33
Tax Liability	16.00	32.00	37.33
PV @ 10% Disc. Rate	14.55	26.45	28.05
Total PV of Tax Liability	69.04		

Depreciation Methods

▪ **Immediate Expensing Method**—the whole capital cost is depreciated in the first year

- Equivalent to declining balance with $d = 100\%$
- A form of accelerated depreciation used as investment incentive

YEAR	1	2	3
Taxable Income before Depreciation	100.00	100.00	100.00
Depreciation Allowance	90.00	0.00	0.00
Taxable Income	10.00	100.00	100.00
Tax Liability	4.00	40.00	40.00
PV @ 10% Disc. Rate	3.64	33.06	30.05
Total PV of Tax Liability	66.75		

Depreciation Methods

▪ **At Loss or Realization**—all depreciation allowances allowed at the time of realization (asset sale) or loss

YEAR	1	2	3
Taxable Income before Depreciation	100.00	100.00	100.00
Depreciation Allowance	0.00	0.00	90.00
Taxable Income	100.00	100.00	10.00
Tax Liability	40.00	40.00	4.00
PV @ 10% Disc. Rate	36.36	33.06	3.01
Total PV of Tax Liability	72.43		

Comparison of Depreciation Methods

- **Total deduction** is the same in each cases (except declining balance requires more than 3 years to get full deduction), but the **difference is in timing**
- The present value of **taxes paid from lowest to highest:**
 1. Immediate Expensing
 2. Declining Balance
 3. Straight Line
 4. At Loss or Realization
- Depreciation is based on **historical cost of capital**, not on the replacement cost of asset
 - Value of asset generally not adjusted for changes in price in subsequent years
 - Some countries allow for inflation adjustments
 - Important to distinguish capital gains/losses and depreciation

Financing Costs

- Financing costs are allowed to be deducted from taxable income. With **higher debt, corporate tax liability is lower**
- Financing costs include:
 - Interest expenses** on loans used to purchase assets (including working capital) used for earning income
 - Accrued cost of discounts on corporate bonds
 - Realized or accrued foreign exchange losses on repayment of principal may be allowed on foreign currency debts
 - Important to distinguish capital gains/losses and depreciation

Financing Costs

Illustration:

A corporation with **100% equity** financing of \$200. The corporate income tax rate is 40%.

YEAR	1	2	3
Taxable Income	100.00	100.00	100.00
Interest Expense	0.00	0.00	0.00
Taxable Income	100.00	100.00	100.00
Tax Liability	40.00	40.00	40.00
PV @ 10% Disc. Rate	36.36	33.06	30.05
Total PV of Tax Liability	99.47		

Financing Costs

Illustration:

Alternatively, a corporation with **50% loan of \$100 at 10% per annum**.

YEAR	1	2	3
Taxable Income	100.00	100.00	100.00
Interest Expense	10.00	10.00	10.00
Taxable Income	90.00	90.00	90.00
Tax Liability	36.00	36.00	36.00
PV @ 10% Disc. Rate	32.73	29.75	27.05
Total PV of Tax Liability	89.53		

Overhead Costs

- Expenses on general administration (legal, accounting, etc), advertising, public relations or business promotion activities **not directly attributable to specific sales**
- A deduction not justified as a cost of doing business is a subsidy (tax expenditure) given by society to a taxpayer
 - A great deal of care to be exercised in scrutinizing deductible items

Capital Gains Tax

- A **capital gains tax** is a tax charged on capital gains, the profit realized on the sale of a **non-inventory** asset (e.g., stocks, bonds, precious metals and property) purchased at a lower price
- The net worth of a company decreases due to depreciation of assets; depreciation is allowed as a deduction from taxable income
 - Appreciation in the value of assets is an addition to net worth and is, therefore, a part of taxable income and subjected to capital gains tax
- Capital gains are typically taxed when **realized, not accrued**
 - Capital losses typically have to be taken against capital gains rather than against ordinary income
 - Unused capital losses are carried forward until gains are realized

Capital Gains Tax

- The general formula: $t_{cg} \times (A_t - A_{t-1})$
 where: t_{cg} is capital gains tax rate; $A_t - A_{t-1}$ is the appreciation; and A_{t-1} is the cost base
 Improvements to asset add to cost base.
- For depreciable assets, many tax systems require any gain on sale of asset more than the depreciated value of the asset to be recognized as income (even where no capital gains tax)
Recaptured Income: $A_t - (A_{t-1} - D_t)$
 where: D_t is the amount of appreciation claimed
 This is important where investment incentives are offered increasing D_t

Capital Gains Tax

- Capital gains tax **deters people from converting profits into investments** (current into capital income)
 - High capital gains tax would create greater tendency to distribute dividends
 - No or low capital gains tax creates an incentive for accumulating capital within the firm
 - ➔ If a company does not distribute dividends, shareholders do not pay income tax on dividends
 - ➔ When the value of shares increases, the shareholder sells the share and pay no or low capital gains tax

Capital Gains Tax

- **Equity value of a company** will capitalize any shifts in expected future after-tax profits from changes in tax structure, productivity, sales or costs
 - This happens continuously where shares are traded publicly
 - As a result, capital gains taxes can result in **double taxation** of these changes in after-tax profits, even before they arise and get reflected in the subsequent company profits and national accounts
 - ➔ Considerations such as these lead to pressures to moderate or remove capital gains taxes on **publicly traded shares**.

Capital Gains Tax

- Capital gains do not represent real incremental current economic activity; they reflect **changing prices of existing assets** such that one person's gain is another person's loss
 - Hence, capital gains taxes are not a significant source of revenues
 - Capital gains should result in net income tax when high income persons captures gain

Treatment of Losses

- Ideally, **income and losses should be treated symmetrically**: tax compensation for losses; particularly important for **risky projects**
- If income and losses are treated symmetrically, then taxation leaves expected net-of-tax return unchanged, but reduces variance in net-of-tax return or lowers risk
 - *Government effectively shares risk with investor*
- If government taxes income, but **under compensates losses**, then **expected net-of-tax return declines** and **variance or risk increases** (relative to symmetrical case)
 - *Government effectively is taking disproportionate share of upside gains relative to loss offsets*
- In practice, profit and capital gain tax tend to take higher share of gains than share of losses

Treatment of Losses

- **Loss Off-Set**:
 - Reduction of taxable income of a company in its profit making activities by an amount equivalent to losses in a risky project
 - **Consolidation of tax accounts** across companies, or **merging companies** to realize tax losses
 - ➔ *Problem for start-up companies: delayed loss realization*
- Alternatively, the loss incurred allowed to be off-set against its profits in an earlier or later period through **loss carried backward** or **loss carried forward**
 - Loss carry back is more valuable (current gain) than loss carry forward (future and uncertain gain)
 - Limits to loss carry forwards often about 5 to 7 years
- Both loss off-set and loss carry forward or carry backward provisions are a form of **income averaging**

Corporate and Personal Income Tax Integration

- Question: Is Corporate Income Tax a Double Taxation?
 - Shareholders' income is taxed twice: (i) at the corporation level through corporate income tax; and (ii) at the individual level through personal income tax on dividends
- Many countries recognize need for some sort of integration between individual and corporate income tax to avoid some undesirable incentives:
 - a) If dividends tax exempt and corporate tax rate low ➔ incentive to convert personal business into corporations
 - b) If corporate tax and capital gains tax rates lower than personal tax rate ➔ incentive to retain earnings
 - c) If personal tax rate lower than corporate rate ➔ incentive to form closely held companies and lower the corporate tax liability by paying higher wages and salaries

Corporate and Personal Income Tax Integration

- **Illustration: No Tax Integration**

- Corporate Income: 200
- Company Income Tax (CIT) @ 40%: 80
- Personal Income: 120
- Personal Income Tax (PIT) @50%: 60
- Total Income Tax (80 + 60): 140 Eff. Tax Rate: 70%

- In case CIT = 80 and Tax on Dividends = 0
 - Incentive to incorporate
 - PIT on the same income = $50\% \times 200 = 100$
- In the above case
 - Higher tax on distribution; Tendency to retain earnings
- If case CIT Rate = 60%; PIT Rate = 50%; CGT Rate = 30%
 - Incentive not to incorporate.
 - Total tax for partnership is $(50\% \times 200) = 100$
 - Total tax if dividends are distributed $(60\% \times 200) + (50\% \times 80) = 160$
 - Total tax if earnings are retained $(60\% \times 200) + (30\% \times 80) = 144$

Tax Integration: Classical System

- **No Integration**—Double Tax Burden; Tax Revenues Decline If Corporations Retain Earnings

	Dividends Distribution		
	0%	50%	100%
Corporate Income	800	800	800
Corporate Income Tax @ 30%	240	240	240
Net Corporate Profit	560	560	560
Personal Income	0	280	560
Personal Income Tax @ 40%	0	112	224
Total Tax Liability	240	352	464
Average Tax Rate	30%	44%	58%

Tax Integration: Split Rate System

- **Split Rate System**—the part of corporate income that is distributed as dividends is taxed at a lower rate than the part retained, but dividends also taxed at individual level

- **Illustration:** Company Tax Rate on Retention 30%
Company Tax Rate on Distribution 20%

	Dividends Distribution		
	0%	50%	100%
Corporate Income	800	800	800
CIT on Retention @ 30%	240	120	0
CIT on Distribution @ 20%	0	80	160
Net Corporate Profit	560	600	640
Personal Income	0	320	640
Personal Income Tax @ 40%	0	128	256
Total Tax Liability	240	248	256
Average Tax Rate	30%	31%	32%

Tax Integration: Partial Integration

- **Partial Integration**—dividends are taxed at the personal income tax rate and retentions are taxed at the corporate income tax rate
 - The entire corporate income is taxed, and the part attributable to dividends is credited back as tax credit

	Dividends Distribution		
	0%	50%	100%
Corporate Income	800	800	800
Corporate Income Tax @ 30%	240	240	240
Net Corporate Profit	560	560	560
Personal Income	0	280	560
Plus: CIT Paid on Dividends	0	120	240
Taxable Income	0	400	800
Personal Income Tax @ 40%	0	160	320
Less: Tax Withheld	0	120	240
Net Tax Payment	0	40	80
Total Tax Liability	240	280	320
Average Tax Rate	30%	35%	40%

Tax Integration: Full Integration

- **Full Integration**—tax on business profits is withheld by full amount and claimed as a credit when personal income tax calculated
 - Shareholders have to declare, as personal income, their share of corporate profit, whether or not this profit was distributed
 - Final tax is at personal income tax rate; taxation of corporate income is just a withholding device
 - If withholding rate is equal to or higher than top personal income tax bracket, individuals would apply for tax refund, rather than pay additional personal income tax later
- **A Likely Problem:** Individuals may claim credit even if taxes not paid at corporate level

Tax Integration: Split Rate System

- **Illustration:**

	Dividends Distribution		
	0%	50%	100%
Corporate Income	800	800	800
Withholding Tax @ 30%	240	240	240
Net Corporate Profit	560	560	560
Personal Income	0	280	560
Taxable Income	800	800	800
Personal Income Tax @ 40%	320	320	320
Less: Tax Withheld	240	240	240
Net Tax Payment	80	80	80
Total Tax Liability	320	320	320
Average Tax Rate	40%	40%	40%

Annex 5: Students in Applied Project Appraisal and Applied Public Finance Courses

NO	APPLIED PROJECT APPRAISAL COURSE	APPLIED PUBLIC FINANCE COURSE
1	Laman Abdullayeva	Elvin Shabanov
2	Gunay Aghazadeh	Ayaz Alakbarov
3	Konul Ahmadova	Tural Agayev
4	Natavan Ahmadova	Sabina Bayverdiyeva
5	Zaur Akhundov	Shahriyar Hasanverdiyev
6	Vali Aliyev	Nargiz Mammadova
7	Sevinj Aliyeva	Zaur Mammadov
8	Azer Azimov	Jalal Gaytaranov
9	Vagif Azizov	Elgun Ibrahimov
10	Kamran Babashov	Gulchohra Shikhlinaskaya
11	Azad Bagirzade	Elvin Mursalov
12	Leyli Cabbarli	Ferhad Valiyev
13	Togrul Gulgezli	Tural Aliyev
14	Gulsum Hasanova	Eltun Movsumov
15	Garanfil Hasanova	Ayten Mammadova
16	Elshan Haziyeu	Laman Alnaghiyeva
17	Zeynab Khidirova	Sevinj Aliyeva
18	Javid Mammadov	Kanan Karimzada
19	Nargiz Mammadova	Fidan Aliyeva
20	Ayten Mammadova	Farida Shukurova
21	Nargiz Mikayilova	Nargiz Mammadova
22	Kamran Murvatov	
23	Lala Mustafayeva	
24	Farid Nazarov	
25	Emin Quluyev	
26	Kenan Sadigli	
27	Sakina Sadiqzada	
28	Zaur Seyidov	
29	Garakhan Shirinli	
30	Khatai Sukhayzade	
31	Nizami Yusifli	
32	Khanim Yusifzada	

Annex 6: Duke University Executive Education Programs in Applied Public Finance

6.1 Project Appraisal and Risk Management (PARM)

6.2 Tax Analysis and Revenue Forecasting (TARF)

6.3 Program on Fiscal Decentralization and Local Government Financial Management (PFD)

6.5 Budgeting and Financial Management in the Public Sector Program (BUDGET)

Project Appraisal and Risk Management Program (PARM)

Please complete this application and submit it via fax to: +919.681.0831 or +919.684.2861

Please include CV listing education and employment history.

Electronic applications are available at www.sanford.duke.edu/dcid and can be submitted on-line.

Please TYPE or PRINT CLEARLY:

SALUTATION FIRST (GIVEN) NAME MIDDLE NAME LAST (FAMILY) NAME

JOB TITLE OR POSITION

ORGANIZATION/EMPLOYER

POSTAL ADDRESS

POSTAL ADDRESS (CONTINUED)

CITY COUNTRY POSTAL CODE

Telephone Numbers (include country and city codes if applicable):

BUSINESS (REQUIRED) FAX (REQUIRED)

MOBILE OTHER (PLEASE SPECIFY)

EMAIL ADDRESS (REQUIRED)

COUNTRY OF CITIZENSHIP (REQUIRED)

DATE OF BIRTH (MONTH/DAY/YEAR) Gender: Male Female

How did you hear about this program?

- Alumni Employer DCID Website DCID Faculty or Staff
 Colleague Brochure The Economist Internet Search

Other, please specify: _____

The cost of the program is US \$11,000

Have you already applied for funding? <input type="checkbox"/> Yes please detail: _____ <input type="checkbox"/> No	Have you received approval for funding? <input type="checkbox"/> Yes <input type="checkbox"/> No
--	--

APPLICANT'S NAME (PLEASE PRINT)

APPLICANT'S SIGNATURE DATE (MONTH/DAY/YEAR)

Telephone: + 919.613.9277 **Email:** dcidexed@duke.edu **Website:** <http://www.sanford.duke.edu/dcid>

Topics to be Covered

Financial Analysis

- *Stages in development of feasibility studies*
- *Technology, engineering and human resource components*
- *Development of cash flow statements*
- *Perspectives on project financial sustainability*
- *Impact of scale, timing and length of life on project viability*
- *Impacts of inflation and exchange rates on financial viability and risks*
- *Cost-effectiveness measures of social programs*
- *Capital markets and financing projects*
- *Internet and other information resources*

Risk Analysis and Management

- *Foundations of uncertainty and risk*
- *Real options*
- *Project design and organizational arrangements*
- *Risk assessment, costing and management techniques*
- *The roles of incentives, sanctions and risk sharing*
- *Contracting and partnership techniques and pricing agreements*

Economic Analysis

- *Economic valuation of goods and services*
- *Economic cost of human resources, capital and foreign exchange*
- *Economic valuation of environmental impacts*
- *Measuring the impacts of projects on stakeholders and poverty reduction*
- *Basic needs valuation for social programs*

Policy Analysis

- *Integration of financial, economic and social appraisals*
- *Appraisal as part of the budget cycle*
- *Analysis of policy-related risks*
- *Market failures and their implications*
- *Government failure and the implications for projects*
- *Privatization, contracting and regulation issues*
- *Public-private partnerships*
- *Appraising major investment projects in various policy environments*
- *Foreign direct investment, joint ventures and taxation*
- *Poverty alleviation and poverty reduction potential of projects and programs*



Duke Center for International Development
 Sanford School of Public Policy
 Box 90237
 Durham, NC 27708-0237
 USA
www.sanford.duke.edu/dcid



Project Appraisal and Risk Management

May 16 - June 11, 2010



Duke Center for International Development

Duke University

Goals

The goal of PARM is to develop the analytical skills of each participant so they can:

- *Analyze the contribution of investment projects to a program or a portfolio of investments*
- *Incorporate policy and decision variables in assessing and designing program and project proposals*
- *Prepare or modify business plans and proposals*
- *Re-engineer projects to mitigate the costs of risk and enhance their returns*
- *Evaluate investment projects from a range of stakeholder perspectives*
- *Plan and assess all aspects of investment projects*
- *Assess investment proposals prepared by other agencies, consultants or proponents of projects*

Participants

This program is for people who design, select, negotiate or finance projects, and for those who are interested in the financial, economic and social impacts of these projects. It will be of special interest to professionals in:

- *Government ministries and public enterprises*
- *Banks (private and public) and financial institutions*
- *Investment analysis*
- *International development agencies*
- *Individual and corporate investment*
- *Private management, engineering and business consulting firms*
- *Public-private partnerships*
- *Regulatory institutions*
- *International aid agencies*

The Program

The Duke Center for International Development (DCID) offers this cutting-edge program on **Project Appraisal and Risk Management (PARM)** for professionals in public and private sector organizations. The program takes place at Duke University in Durham, North Carolina, U.S., **May 16 – June 11, 2010**.

The four-week PARM Program teaches financial, economic, stakeholder, and risk analysis and risk management through real and applied case studies, lectures, group discussions, participant presentations and computer exercises.

Participants take part in a short working trip to Washington, D.C., where they have the opportunity to interact with professionals from international financial institutions. Leading experts in specialized areas are also invited to address participants. Additionally, program participants work on a real project in their own sectors of interest.

The program takes participants through a flexible appraisal framework designed to handle different types of projects from commercial enterprises and utilities to infrastructure investments and social programs, as well as a wide range of issues from environmental impacts to risk management and poverty reduction impacts.

Each year, new developments are highlighted. This framework not only handles public sector investment projects and programs, but it is particularly well suited to the assessment of projects implemented by the private sector in competitive markets, in regulated sectors or in partnership with the public sector. In all these cases, the analysis of project designs from the perspectives of the different stakeholders is crucial to the choice of sustainable and performance-enhancing arrangements. Dif-

ferent forms of domestic and international finance, ownership and tax issues are highlighted and incorporated in the appraisal framework.

The program provides participants with the knowledge and tools to help them conduct project and program analysis in their jobs, and an enhanced understanding of the valuation and management of firms and projects.

Formerly offered as the Program on Investment Appraisal and Management (PIAM) by the Public Finance Group (PFG) at the Harvard Institute for International Development (HIID), the program has a long and successful tradition of professional education in project appraisal. In 2001, the PFG and the program moved to DCID at Duke University. The program, now in its ninth year at Duke, continues as the program on Project Appraisal and Risk Management (PARM).

Methods of Study

Professionals benefit most from a program of study that stresses the application of analytical tools as solutions for practical problems. PARM has been designed with this goal in mind.

The program consists of lectures, discussion groups, case studies and computer-based exercises. Program participants spend the balance of the day examining case studies, using computers to analyze investment projects and discussing presentations. Participants will complete a series of short case studies designed to illustrate specific appraisal techniques. In addition, each participant will work in a small group on a major feasibility study that applies the full range of techniques learned. Program participants are encouraged to bring material on projects of current interest to them and their organizations to form the basis of these major case studies. Participants will also be encouraged to find additional relevant case information and data through the Internet and Duke University electronic resources. Lectures and seminars on special topics will be conducted by Duke Faculty members and by international experts from the public and private sectors.

It is highly recommended that participants have a basic understanding of personal computers, spreadsheets and word processing. During the program, each participant will have the use of a laptop computer and access to the Internet and the university network resources.

Faculty

Leading the workshop will be Dr. Graham Glenday and Dr. Fernando Fernholz. Other Duke University faculty representing different disciplines and perspectives, senior practitioners in project appraisal and risk management in international organizations, financial institutions, and other prominent development institutions will also contribute to the workshop.

Tuition and Funding

Tuition for the program is \$11,000, which includes housing, emergency medical insurance, course materials, use of a laptop computer for the duration of the program and access to the Duke University Libraries and computer facilities.

Tuition does not cover airfare to and from Raleigh-Durham International Airport (RDU), meals or incidental expenses, which vary for each participant. Expenses for meals and incidentals are estimated at \$50 per day. Additional expenses that may be incurred can include: taxis, other local transportation costs and excess baggage and/or shipping charges.

Participants are typically sponsored by their employer or a funding organization. *Candidates should approach their current employer or other funding organizations as soon as possible in order to arrange financial support.* Examples of agencies that offer financial assistance for training include the United Nations Development Program (UNDP), the United States Agency for International Development (USAID), the World Bank, regional development banks, bilateral donors such as the Canadian International Development Agency (CIDA), and development-oriented foundations. In most cases, participants' employers should apply to the branch or mission of the funding agency in their respective country (not in the U.S.) for training funds.

For the 2010 program on Project Appraisal and Risk Management, scholarships and financial aid are not available from Duke University or DCID. Discounts are available for organizations sponsoring three or more participants in the program. Please contact DCID for more information.

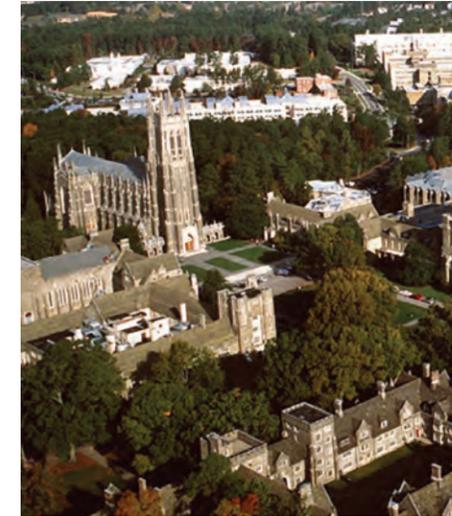
Housing and Activities

Local housing accommodations and a daily shuttle to and from campus are included in the program. Group extra-curricular activities will be organized to offer participants the opportunity to socialize and enjoy area attractions. Taxis, buses and other transportation options are available for hire to provide individual access to local destinations.

Duke University

Duke University, located in Durham, North Carolina, U.S., is a world-class academic institution and one of the top 10 universities in the United States. It is an independent, comprehensive, coeducational research university that offers a variety of outstanding undergraduate and graduate programs that are consistently ranked at or near the top of their respective fields.

The Duke Center for International Development (DCID) is an interdisciplinary training, advisory and research unit offering cutting-edge graduate degree and executive education programs in international development policy. DCID is a unit within the Sanford School of Public Policy.



Admission Policy and Application Process

The PARM Program is open to individuals working professionally in finance, economics, accounting, taxation, management, engineering or related fields. A candidate's professional experience is taken into consideration. A first degree (bachelor's or other undergraduate equivalent) is preferred. The program will be conducted in English.

Interested candidates should complete the attached application form and **submit it via fax or by e-mail** along with a copy of their CV. **Online applications are available at www.sanford.duke.edu/dcid.** *We strongly recommend that application be made as early as possible to allow sufficient time to obtain a visa for the United States.* Applications will be reviewed as they are received and qualified applicants will be admitted on a rolling basis until all available positions are filled. Applicants should contact the DCID office if they do not receive confirmation of receipt of their application within 5 working days. Applications received after **April 16, 2010** may be placed on a waiting list and admitted on a space-available basis.

Contact Information

Dr. Graham Glenday and Dr. Fernando Fernholz, *Program Directors*
Program on Project Appraisal and Risk Management (PARM)

Duke Center for International Development
Sanford School of Public Policy
Box 90237
Durham, NC 27708-0237 U.S.

Tel: +919.613.9277

Fax: +919.681.0831 or +919.684.2861

Email: dcidexed@duke.edu

Web: www.sanford.duke.edu/dcid

Tax Analysis and Revenue Forecasting Program (TARF)

Please complete this application and submit it via fax to: +919.681.0831 or +919.684.2861

Please include CV listing education and employment history.

Electronic applications are available at www.sanford.duke.edu/dcid and can be submitted on-line.

Please TYPE or PRINT CLEARLY:

SALUTATION FIRST (GIVEN) NAME MIDDLE NAME LAST (FAMILY) NAME

JOB TITLE OR POSITION

ORGANIZATION/EMPLOYER

POSTAL ADDRESS

POSTAL ADDRESS (CONTINUED)

CITY COUNTRY POSTAL CODE

Telephone Numbers (include country and city codes if applicable):

BUSINESS (REQUIRED) FAX (REQUIRED)

MOBILE OTHER (PLEASE SPECIFY)

EMAIL ADDRESS (REQUIRED)

COUNTRY OF CITIZENSHIP (REQUIRED)

DATE OF BIRTH (MONTH/DAY/YEAR) Gender: Male Female

How did you hear about this program?

- Alumni Employer DCID Website DCID Faculty or Staff
 Colleague Brochure The Economist Internet Search

Other, please specify: _____

The cost of the program is US \$10,250

Have you already applied for funding? <input type="checkbox"/> Yes please detail: _____ <input type="checkbox"/> No	Have you received approval for funding? <input type="checkbox"/> Yes <input type="checkbox"/> No
--	--

APPLICANT'S NAME (PLEASE PRINT)

APPLICANT'S SIGNATURE DATE (MONTH/DAY/YEAR)

Telephone: + 919.613.9277 Email: dcidexed@duke.edu Website: <http://www.sanford.duke.edu/dcid>

Topics to be Covered

Tax Analysis

- Principles of taxation
- Tax reform and its implementation
- Economic impact of taxes and subsidies
- Consumption and expenditure taxes
- Taxes on international trade
- Taxation of income
- International tax harmonization
- Wealth and asset taxation
- Property and real estate taxes
- Taxation and natural resources
- Taxation of financial sectors
- Taxation of e-commerce
- Inflation and taxation



Revenue Forecasting

- Value-added tax, excises
- Trade tax
- Personal income taxes
- Corporate income taxes
- Taxes on natural resources
- Property taxes



Computer Applications

- Introduction to computers and computerization
- Microcomputers in revenue forecasting

Empirical Techniques and Models

- Micro-simulation models
- Typical taxpayer model
- Macroeconomic models
- GDP-based forecasting models
- Regression analysis
- Sampling techniques
- Consumer expenditure surveys
- Receipts model

www.sanford.duke.edu/dcid

USA

Durham, NC 27708-0237

Box 90237

Sanford School of Public Policy

Duke Center for International Development



Goals

TARF is designed to:

- Equip participants with the theoretical foundations for analyzing tax systems and hands-on techniques for evaluating their revenue performance
- Enable participants to assess and quantify impacts of alternative fiscal policies on a variety of economic entities
- Instruct participants in the use of micro-simulation and macroeconomic models for effective tax analysis and revenue forecasting
- Build an international network of professionals to enhance understanding and experience sharing

Participants

This program has been especially created for:

- Public-sector executives at mid- and upper-levels of management
- Officials in tax administration, ministries of finance and any other revenue-raising agencies
- Professionals in multilateral and regional banks and other international organizations involved with fiscal affairs
- Private-sector professionals who are in a position to apply these concepts and techniques
- Consultants providing assistance to decision makers in public and private sectors

The Program

The Duke Center for International Development will conduct the program on **Tax Analysis and Revenue Forecasting (TARF)** at Duke University in Durham, North Carolina, U.S., **June 27–July 23, 2010**. The four-week TARF Program covers the economic foundations of tax policy, revenue forecasting, statistical techniques and computer-based revenue estimation models for the value-added tax, personal and corporate income tax, excises, property tax, trade taxes and taxes on natural resources. The application of macroeconomic models, micro-simulation models and typical taxpayer models are also covered.

Program Background

Tax analysis and revenue forecasting have become increasingly important functions as governments undertake reforms of their tax systems to enhance revenues, improve the equity and efficiency of taxes, and promote investment, economic growth and exports. In addition, fiscal and tax policy stability are increasingly recognized as key to promoting private-sector investment, both domestic and foreign.

The importance of having the capacity to deal with these key tax policy issues has prompted governments in an increasing number of countries to seek the development of in-house skills and aptitudes in tax analysis and revenue forecasting.

The program on Tax Analysis and Revenue Forecasting, now in its eighth year at Duke University, was formerly offered at the Harvard Institute for International Development at Harvard University, by the Public Finance Group. The Public Finance Group and the TARF program moved to Duke University and the Duke Center for International Development in 2001. The faculty in this group have been

involved in some of the best-known tax reforms around the world and have a combined experience of more than 75 years of research and advisory work in the field.

Methods of Study

The study method will be a combination of class lectures, case studies, group exercises and presentations, discussion sessions and hands-on computer exercises.

A typical day starts with lectures covering theoretical aspects followed by practical computer-based applications that enable participants to immediately apply and absorb the subject matter.

Additionally, all participants are expected to complete a major tax modeling and forecasting exercise that is directly applicable to work in the agency or department where they are employed in their country or organization. This exercise is based on real tax data brought by participants and is completed individually or in groups of two to three participants.

The course includes a significant amount of hands-on computer work, and it is helpful if the participants have a basic understanding of personal computers, spreadsheets and word processing. During the program, each participant will have the use of a laptop computer and access to the Internet and university network resources.

Faculty

Leading the workshop will be Dr. GP Shukla, joined by other senior Duke faculty members representing various disciplines and perspectives. Senior practitioners dealing with issues of tax analysis and revenue forecasting in governments, international agencies and other prominent universities in the United States will also be involved in the workshop.

Tuition and Funding

Tuition for the program is \$10,250, which includes housing, emergency medical insurance, course materials, use of a laptop computer for the duration of the program and access to the Duke University Libraries and computer facilities. Tuition does not cover airfare to and from Raleigh-Durham International Airport (RDU), meals or incidental expenses, which vary for each participant. Expenses for meals and incidentals are estimated at \$50 per day. Additional expenses that may be incurred can include: taxis, other local transportation costs and excess baggage and/or shipping charges.



Participants are typically sponsored by their employer or a funding organization. *Candidates should approach their current employer or other funding organizations as soon as possible in order to arrange financial support.* Examples of agencies that offer financial assistance for training include the United Nations Development Program (UNDP), the United States Agency for International Development (USAID), the World Bank, regional development banks, and bilateral donors such as the Canadian International Development Agency (CIDA), and development oriented foundations. In most cases, participants' employers should apply to the branch or mission of the funding agency in their country (not in the U.S.) for training funds.

For the 2010 program on Tax Analysis and Revenue Forecasting, scholarships and financial aid are not available from Duke University or DCID. Discounts are available for organizations sponsoring three or more participants in the program. Please contact DCID for more information.

Housing and Activities

Local housing accommodations and a daily shuttle to and from campus are included in the program. Group extra-curricular activities will be organized to offer participants the opportunity to socialize and enjoy area attractions. Taxis, buses, and other transportation options are available for hire to provide individual access to local destinations.

Duke University

Duke University, located in Durham, North Carolina, U.S., is a world-class academic institution and one of the top 10 universities in the United States. It is an independent, comprehensive, coeducational research university that offers a variety of outstanding undergraduate and graduate programs that are consistently ranked at or near the top of their respective fields.

The Duke Center for International Development (DCID) is an interdisciplinary training, advisory and research unit offering cutting-edge graduate degree and executive education programs in international development policy. DCID is a unit within the Sanford School of Public Policy.



Admission Policy and Application Process

The TARF Program is open to individuals working professionally in tax policy, tax administration, economics, finance, accounting, management or related fields. A candidate's professional experience is taken into consideration. A first degree (bachelor's or other undergraduate equivalent) is preferred. The program will be conducted in English.

Interested candidates should complete the attached application form and **submit it via fax or by e-mail** along with a copy of their CV. **Online applications are available at www.sanford.duke.edu/dcid.** *We strongly recommend that application be made as early as possible to allow sufficient time to obtain a visa for the United States.* Applications will be reviewed as they are received and qualified applicants will be admitted on a rolling basis until all available positions are filled. Applicants should contact the DCID office if they do not receive confirmation of receipt of their application within 5 working days. Applications received after **May 27, 2010** may be placed on a waiting list and admitted on a space-available basis.

Contact Information

Dr. GP Shukla, *Program Director*

Program on Tax Analysis and Revenue Forecasting (TARF)

Duke Center for International Development

Sanford School of Public Policy

Box 90237

Durham, NC 27708-0237 U.S.

Tel: +919.613.9277

Fax: +919.681.0831 or +919.684.2861

Email: dcidexed@duke.edu

Web: www.sanford.duke.edu/dcid

Program on Fiscal Decentralization and Local Government Financial Management (PFD)

Please complete this application and submit it via fax to: +919.681.0831 or +919.684.2861

Please include CV listing education and employment history.

Electronic applications are available at www.sanford.duke.edu/dcid and can be submitted on-line.

Please TYPE or PRINT CLEARLY:

SALUTATION FIRST (GIVEN) NAME MIDDLE NAME LAST (FAMILY) NAME

JOB TITLE OR POSITION

ORGANIZATION/EMPLOYER

POSTAL ADDRESS

POSTAL ADDRESS (CONTINUED)

CITY COUNTRY POSTAL CODE

Telephone Numbers (include country and city codes if applicable):

BUSINESS (REQUIRED) FAX (REQUIRED)

MOBILE OTHER (PLEASE SPECIFY)

EMAIL ADDRESS (REQUIRED)

COUNTRY OF CITIZENSHIP (REQUIRED)

DATE OF BIRTH (MONTH/DAY/YEAR) Gender: Male Female

How did you hear about this program?

- Alumni Employer DCID Website DCID Faculty or Staff
 Colleague Brochure The Economist Internet Search

Other, please specify: _____

The cost of the program is US \$8,350

<p>Have you already applied for funding? <input type="checkbox"/> Yes please detail: _____ <input type="checkbox"/> No</p>	<p>Have you received approval for funding? <input type="checkbox"/> Yes <input type="checkbox"/> No</p>
---	---

APPLICANT'S NAME (PLEASE PRINT)

APPLICANT'S SIGNATURE DATE (MONTH/DAY/YEAR)

Telephone: + 919.613.9277 Email: dcidexed@duke.edu Website: <http://www.sanford.duke.edu/dcid>

Topics to be Covered

Administrative Decentralization

- Trends in political, administrative and fiscal decentralization
- Roles of central and sub-national governments
- Options for intergovernmental cooperation and administration
- Strategies for effective decentralization
- Managing the decentralization process

Fiscal Decentralization

- Public choice and fiscal federalism
- Allocating expenditure and revenue responsibilities
- Designing intergovernmental transfers
- Structuring local government borrowing
- Alternatives for enhancing local resource mobilization



Intergovernmental Transfers

- Structuring recurrent and development transfers
- Designing effective performance-based grant systems
- Ensuring a coordinated intergovernmental transfer system
- Monitoring intergovernmental transfers



Local Revenue Systems

- Property taxation
- User charges
- Business taxation, license fees, and permits
- Excise taxes
- Motor vehicle taxation
- Income and sales taxation

Fiscal Planning and Management

- Budgeting and financial management
- Revenue forecasting
- Debt management
- Resource administration
- Special problems of local revenue administration

www.sanford.duke.edu/dcid

USA

Durham, NC 27708-0237

Box 90237

Sanford School of Public Policy

Duke Center for International Development



Fiscal Decentralization and Local Government Financial Management

July 11 - July 30, 2010



Duke Center for International Development

Duke University

Goals

This program covers the theory and provides practical applications of fiscal decentralization, intergovernmental transfers, resource mobilization and establishment of local revenue systems. Through a series of lectures, international case studies, workshops and computer applications, the program focuses on analyzing policy and administrative options related to fiscal decentralization, the structure of intergovernmental transfers and the major revenue sources available to local governments.



Participants

The program has been specifically created for government officials, policy makers, program managers, politicians and consultants dealing with decentralization and local government reforms. It is expected that participants will include central- and local-level elected politicians, policymakers and administrators, economists, finance managers, and public sector management specialists from central and local governments, international agencies, NGOs and research and training institutions.

The Program

The Duke Center for International Development will conduct the **Program on Fiscal Decentralization and Local Government Financial Management (PFD)** at Duke University, Durham, North Carolina, U.S., **July 11– July 30, 2010**. This comprehensive, three-week program focuses on the theory and practice of fiscal decentralization, and the role of local government in the movement towards more autonomous and accountable local government finance. Attention is focused on the economic, administrative and legal dimensions of central-local fiscal relations, with special emphasis on local revenues and intergovernmental transfer systems. The program is designed to better enable professionals to initiate policy and administrative reforms to improve local public financial management and stimulate efficient and accountable economic and social development.

Program Background

Decentralization strategies are being implemented worldwide to improve service delivery, economic governance and citizen participation. These reforms are rationalizing central-local expenditure and revenue responsibilities, intergovernmental transfers and local borrowing, while strengthening local financial management, revenue mobilization, participatory planning and local service delivery.

The Program on Fiscal Decentralization and Local Government Financial Management, now in its eighth year at Duke University, was formerly offered at the Harvard Institute for International Development, by the Public Finance Group. The Public Finance Group and PFD moved to Duke University and the Duke Center for International Development in 2001. PFD is designed specifi-



cally for elected politicians and public officials who are responsible for designing and implementing fiscal decentralization strategies, restructuring intergovernmental transfers, strengthening local government revenue systems and enacting local government reforms.

Methods of Study

Course participants are engaged in a learning environment of class lectures, case study presentations, discussion sessions, computer-based exercises and field visits.

Throughout the course, participants are constantly rotated into smaller working groups to analyze key decentralization, financial management and local revenue mobilization issues. Role-playing is used to illustrate differing stakeholder perspectives while group presentations serve as the basis for plenary discussion sessions.

During the program, each participant will have computer and Internet access. The program will be conducted in English.

Faculty

The program is directed by Dr. Roy Kelly, who has over 25 years of international experience designing and implementing intergovernmental reforms in Africa, Asia, Latin America and Eastern Europe. Dr. Kelly is joined by other senior Duke faculty members together with experienced practitioners from international organizations representing various disciplines, perspectives and country experience.

Tuition and Funding

Tuition for the program is \$8,350, which includes housing, emergency medical insurance, course materials and access to the Duke University Libraries and computer facilities. Tuition does not cover airfare to and from Raleigh-Durham International Airport (RDU), meals or incidental expenses, which vary for each participant. Expenses for meals and incidentals are estimated at \$50 per day. Additional expenses that may be incurred can include: taxis, other local transportation costs and excess baggage and/or shipping charges.

Participants are typically sponsored by their employer or a funding organization. *Candidates should approach their current employer or other funding organizations as soon as possible in order to arrange financial support.* Examples of agencies that offer financial assistance for training include the United Nations Development Program (UNDP), the United States Agency for International Development (USAID), the World Bank, regional development banks, bilateral donors such as the Canadian International Development Agency (CIDA), and development-oriented foundations. In most cases, participants' employers should apply to the branch or mission of the funding agency in their country (not in the U.S.) for training funds.

For the 2010 Program on Fiscal Decentralization, scholarships and financial aid are not available from Duke University or DCID. Discounts are available for organizations sponsoring three or more participants in the program. Please contact DCID for more information.

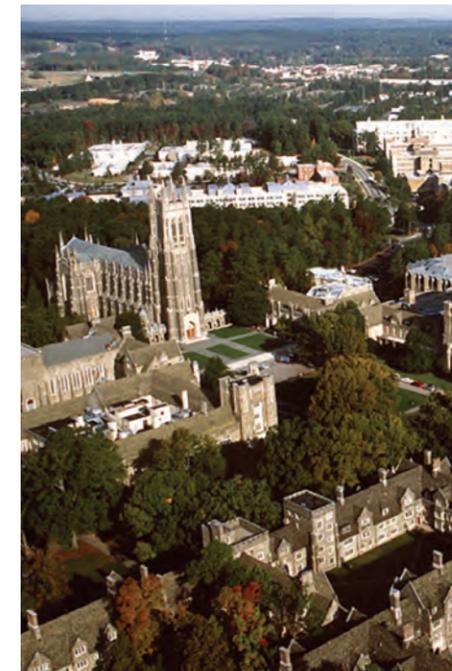
Housing and Activities

Local housing accommodations and a daily shuttle to and from campus are included in the program. Group extra-curricular activities will be organized to offer participants the opportunity to socialize and enjoy area attractions. Taxis, buses, and other transportation options are available for hire to provide individual access to local destinations.

Duke University

Duke University, located in Durham, North Carolina, U.S., is a world-class academic institution and one of the top 10 universities in the United States. It is an independent, comprehensive, coeducational research university that offers a variety of outstanding undergraduate and graduate programs that are consistently ranked at or near the top of their respective fields.

The Duke Center for International Development (DCID) is an interdisciplinary training, advisory and research unit offering cutting-edge graduate degree and executive education programs in international development policy. DCID is a unit within the Sanford School of Public Policy.



Admission Policy and Application Process

The Program on Fiscal Decentralization and Local Government Financial Management (PFD) is open to individuals working professionally in finance, economics, law, government administration or related fields. A candidate's professional experience is taken into consideration. A first degree (bachelor's or other undergraduate equivalent) is preferred. The program will be conducted in English.

Interested candidates should complete the attached application form and **submit it via fax or by e-mail** along with a copy of their CV. **Online applications are available at www.sanford.duke.edu/dcid.** *We strongly recommend that application be made as early as possible to allow sufficient time to obtain a visa for the United States.* Applications will be reviewed as they are received and qualified applicants will be admitted on a rolling basis until all available positions are filled. Applicants should contact the DCID office if they do not receive confirmation of receipt of their application within 5 working days. Applications received after **June 11, 2010** may be placed on a waiting list and admitted on a space-available basis.

Contact Information

Dr. Roy Kelly, *Program Director*

Program on Fiscal Decentralization and Local Government Financial Management (PFD)

Duke Center for International Development
Sanford School of Public Policy
Box 90237

Durham, NC 27708-0237 U.S.

Tel: +919.613.9277

Fax: +919.681.0831 or +919.684.2861

Email: dcidexed@duke.edu

Web: www.sanford.duke.edu/dcid

Budgeting and Financial Management in the Public Sector Program (BUDGET)

Please complete this application and submit it via fax to: +919.681.0831 or +919.684.2861

Please include CV listing education and employment history.

Electronic applications are available at www.sanford.duke.edu/dcid and can be submitted on-line.

Please TYPE or PRINT CLEARLY:

SALUTATION FIRST (GIVEN) NAME MIDDLE NAME LAST (FAMILY) NAME

JOB TITLE OR POSITION

ORGANIZATION/EMPLOYER

POSTAL ADDRESS

POSTAL ADDRESS (CONTINUED)

CITY COUNTRY POSTAL CODE

Telephone Numbers (include country and city codes if applicable):

BUSINESS (REQUIRED) FAX (REQUIRED)

MOBILE OTHER (PLEASE SPECIFY)

EMAIL ADDRESS (REQUIRED)

COUNTRY OF CITIZENSHIP (REQUIRED)

DATE OF BIRTH (MONTH/DAY/YEAR) Gender: Male Female

How did you hear about this program?

- Alumni Employer DCID Website DCID Faculty or Staff
 Colleague Brochure The Economist Internet Search

Other, please specify: _____

The cost of the program is US \$9,500

<p>Have you already applied for funding?</p> <p><input type="checkbox"/> Yes</p> <p>please detail: _____</p> <p><input type="checkbox"/> No</p>	<p>Have you received approval for funding?</p> <p><input type="checkbox"/> Yes</p> <p><input type="checkbox"/> No</p>
---	---

APPLICANT'S NAME (PLEASE PRINT)

APPLICANT'S SIGNATURE DATE (MONTH/DAY/YEAR)

Telephone: + 919.613.9277 Email: dcidexed@duke.edu Website: <http://www.sanford.duke.edu/dcid>

Topics to be Covered

- Budget and macro-economy
- Financial programming
- Public finance and economic growth
- Financing the budget and budget deficits
- Revenue forecasting techniques
- Management and organization of budget processes
- Alternative budget frameworks including MTEF (medium-term expenditure framework)
- Input-control and output-oriented performance or results-based budgeting techniques
- Balanced scorecard approaches to budgeting and management
- Budget as an instrument of managerial performance
- Monitoring and evaluation of budget performance
- Capital budgeting, cost-benefit and cost-effectiveness analyses
- Public financial management reforms and fiscal adjustment in emerging and developing countries
- Fiscal transparency standards and assessment
- Budget implementation, cash budgeting and budget monitoring techniques
- Role, budgeting and management of foreign aid-financed projects and programs
- Fiscal aspects of external and domestic debt management
- Fiscal decentralization and budgeting
- Budgeting and poverty reduction strategies
- Budget reforms in the context of globalization
- Negotiation techniques and conflict resolution



www.sanford.duke.edu/dcid

Duke Center for International Development
 Sanford School of Public Policy
 Box 90237
 Durham, NC 27708-0237
 USA



Budgeting and Financial Management in the Public Sector

July 18 - August 6, 2010



Duke Center for International Development

Duke University



Goals

The BUDGET program seeks to develop the analytical and operational skills of participants. Particular attention is given to the following:

- *The inter-relationship between the government budget and the national economy*
- *Alternative conceptual approaches to resource allocation and budget formulation*
- *Analytical techniques and tools such as cost-benefit analysis, revenue forecasting, costing of public services, input, output, and outcome-oriented budgeting techniques*
- *The role of improved and novel budget processes in enhancing the efficiency of public expenditures*
- *Evolving approaches to control and management of public expenditures*
- *Issues and challenges in promoting budget and financial reform*
- *Budgetary aspects of fiscal decentralization*

Participants

The program is designed for:

- *Budget analysts*
- *Administrators in the central ministries of finance and planning*
- *Administrators in state or provincial level ministries of finance and planning*
- *Officials in sector ministries*
- *Managers of public enterprises*
- *Professionals in aid agencies*
- *Economists*
- *Accountants and auditors*

The Program

The Duke Center for International Development will conduct the program on **Budgeting and Financial Management in the Public Sector (BUDGET)** at Duke University in Durham, North Carolina, U.S., **July 18–August 6, 2010**. The three-week program is organized around four modules—budget and the national economy, budget processes and frameworks, budgeting and financial management techniques, and public sector reform. The program is a combination of theoretical concepts and techniques, and practical applications based on experience in the field.

Program Background

Budgeting and financial management have been at the core of economic, financial management, and public sector reform programs in most nations around the world. These have also been the principal instruments of transformation and restructuring of the public sector in several countries. With the growing pressures for enhanced service delivery and the challenges of budgetary crises and fiscal shocks, the need for improved budget processes and innovative financial management techniques is increasingly felt in developing, emerging and transition economies.

The program on Budgeting and Financial Management in the Public Sector was formerly offered at the Harvard Institute for International Development by the Public Finance Group. The professionals in the group have been involved in some of the best-known fiscal and budgetary reforms around the world and have a combined experience of more than 50 years of research and advisory work in this field. The Public Finance Group and BUDGET moved to the Duke Center for International Development (DCID), Duke University, in 2001. Drawing

upon the practical experiences and expertise of the group, DCID offers this unique program focusing on the various aspects of budgeting and different instruments of financial management in the public sector. The program will be in its eighth year at Duke University in 2010.

Methods of Study

The study method will be a combination of class lectures, case study presentations, discussion and negotiation sessions, individual assignments and hands-on computer exercises. In addition, all participants are expected to complete a major case study related to the budgeting process directly applicable to their country or organization. It is recommended that participants have a basic understanding of personal computers, spreadsheets and word processing. Each participant will have the use of a laptop computer for the duration of the program and access to the Internet and university network resources. The program will be conducted in English.

Faculty

Instructors include Drs. Graham Glenday, GP Shukla, Richard Hemming (formerly of the International Monetary Fund) and Roy Kelly, other faculty members from Duke University, and senior practitioners dealing with issues of budgeting and instruments of financial management in the public sector. In past years, the workshop faculty included: Dr. Malcolm McPherson, Dr. Richard Goldman, and Dr. Bruce Bolnick from Harvard University; Mr. Paul Cramer from Accenture Negotiation Center of Excellence; Prof. John L. Mikesell of Indiana University; Dr. Schiavo-Campo of the World Bank; and Mr. Tej Prakash from the International Monetary Fund. The 2010 program will include many of the same faculty members.

Tuition and Funding

Tuition for the program is \$9,500, which includes housing, emergency medical insurance, course materials, use of a laptop computer for the duration of the program and access to the Duke University Libraries and computer facilities. Tuition does not cover airfare to and from Raleigh-Durham International Airport (RDU), meals or incidental expenses, which vary for each participant. Expenses for meals and incidentals are estimated at \$50 per day. Additional expenses that may be incurred can include: taxis, other local transportation costs and excess baggage and/or shipping charges.



Participants are typically sponsored by their employer or a funding organization. *Candidates should approach their current employer or other funding organizations as soon as possible in order to arrange financial support.* Examples of agencies that offer financial assistance for training include the United Nations Development Program (UNDP), the United States Agency for International Development (USAID), the World Bank, regional development banks, bilateral donors such as the Canadian International Development Agency (CIDA), and development-oriented foundations. In most cases, participants' employers should apply to the branch or mission of the funding agency in their country (not in the U.S.) for training funds.

For the 2010 program on Budgeting and Financial Management in the Public Sector, scholarships and financial aid are not available from Duke University or DCID. Discounts are available for organizations sponsoring three or more participants in the program. Please contact DCID for more information.

Housing and Activities

Local housing accommodations and a daily shuttle to and from campus are included in the program. Group extra-curricular activities will be organized to offer participants the opportunity to socialize and enjoy area attractions. Taxis, buses and other transportation options are available for hire to provide individual access to local destinations.

Duke University

Duke University, located in Durham, North Carolina, U.S., is a world-class academic institution and one of the top 10 universities in the United States. It is an independent, comprehensive, coeducational research university that offers a variety of outstanding undergraduate and graduate programs that are consistently ranked at or near the top of their respective fields.

The Duke Center for International Development (DCID) is an interdisciplinary training, advisory and research unit offering cutting-edge graduate degree and executive education programs in international development policy. DCID is a unit within the Sanford School of Public Policy.



Admission Policy and Application Process

Applicants for the BUDGET Program should be middle- and senior-level managers with a substantial record related to public service. A candidate's professional experience is taken into consideration. A first degree (bachelor's or other undergraduate equivalent) is preferred. The program will be conducted in English.

Interested candidates should complete the attached application form and **submit it via fax or by e-mail** along with a copy of their CV. **Online applications are available at www.sanford.duke.edu/dcid.** *We strongly recommend that application be made as early as possible to allow sufficient time to obtain a visa for the United States.* Applications will be reviewed as they are received and qualified applicants will be admitted on a rolling basis until all available positions are filled. Applicants should contact the DCID office if they do not receive confirmation of receipt of their application within 5 working days. Applications received after **June 18, 2010** may be placed on a waiting list and admitted on a space-available basis.

Contact Information

Dr. Graham Glenday and Dr. GP Shukla, *Program Directors*

Program on Budgeting and Financial Management in the Public Sector (BUDGET)

Duke Center for International Development
Sanford School of Public Policy
Box 90237
Durham, NC 27708-0237 U.S.

Tel: +919.613.9277

Fax: +919.681.0831 or +919.684.2861

Email: dcidexed@duke.edu

Web: www.sanford.duke.edu/dcid