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Colin A. Gannon
Zhi Liu

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TABLE OF CONTENTS

PREFACE	iii
EXECUTIVE SUMMARY	v
1. INTRODUCTION	1
2. THE ROLE OF TRANSPORT IN POVERTY REDUCTION	3
<i>Approaches to Poverty Reduction</i>	3
<i>Transport Development and Poverty Reduction</i>	4
<i>Impacts of Transport on Economic Growth</i>	6
<i>Importance of Access for the Poor</i>	11
<i>Summary</i>	12
3. EFFICIENCY AND EQUITY IN TRANSPORT OPERATIONS	14
<i>Distributive Impacts: A Taxonomy of Scenarios</i>	14
<i>The Potential Conflict between Efficiency and Poverty Alleviation</i>	16
<i>Efficiency and Direct Intervention in Transport Sector Operations</i>	21
<i>Summary</i>	22
4. DISTRIBUTIVE IMPACTS OF TRANSPORT PROJECTS ON THE POOR	23
<i>Is the Efficiency Criterion Regressive?</i>	23
<i>Market Failures and Institutional Failures</i>	28
<i>Government Regulations</i>	29
<i>Summary</i>	31
5. DIRECT ASSISTANCE TO THE POOR WITHIN THE TRANSPORT SECTOR	33
<i>Transport Needs of the Poor</i>	33
<i>Rural Transport</i>	35
<i>Gender Issues Associated with Poverty and Transport</i>	36
<i>Transport for the Urban Poor</i>	38
<i>Labor-Based Methods</i>	40
<i>Promoting the Use of Non-Motorized Transport</i>	41
<i>Summary</i>	42
6. IMPROVING THE TREATMENT OF POVERTY ISSUES IN TRANSPORT OPERATIONS	43
<i>Major Issues in the Treatment of Poverty</i>	43
<i>Areas for Improvement</i>	44
<i>Addressing Poverty Issues throughout the Project Cycle</i>	46
APPENDIX 1	
<i>A Review of the World Bank's Transport Sector Operations</i>	52
APPENDIX 2	
<i>Data for the Evaluation of the Poverty Profile in a Project-Affected Area</i>	57

TABLES

A.1	Transport Projects with Poverty Objective, 1988-97.....	53
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FIGURES

2.1	Economic Impacts of Transport Investments.....	5
3.1	Distributive Outcome Scenarios.....	16
3.2	Efficiency-Equity Trade-offs in Project Selection.....	18
3.3	Distribution for Project Net Benefits	19
3.4	Efficiency and Distributional Impact of Project Options across Sectors	20

BOXES

5.1	Transport Profile of the Poor.....	34
5.2	Bangladesh—Improving Rural Roads and Markets.....	36
5.3	Targeting the Transport Problems of the Urban Poor	39
5.4	Ghana—Labor-Based Methods of Road Work.....	40
5.5	Introducing Intermediate Transport Technology to Help the Rural Poor in Ghana	41
6.1	Selecting Road Improvement Components for Poverty Alleviation.....	47

PREFACE

This paper arose out of a recognition that an articulation of the role of transport sector operations in contributing to poverty reduction did not exist. By and large, transport projects are assessed in terms of reducing transport costs, improving efficiency, and promoting economic growth. The contribution of transport operations to poverty alleviation is seen, in general, as indirect and stemming from broadly based economic development. Yet, most direct poverty-targeted interventions (schools, health clinics, nutrition programs, and social services) depend on transport as a complementary input for their effective delivery. With few exceptions, the distributive impact of transport projects (i.e., how much various social groups gain and lose) and the potential for transport projects to play a direct proactive role in assisting the poor has received little attention.

It is desirable and timely to assess prevailing views of the role of transport projects in poverty alleviation and to take stock of the treatment of poverty issues. Accordingly, a review of recent transport operations was undertaken to comprehend existing practices and to identify innovative approaches. The present paper was prepared against this background. The primary objective is to establish a sound conceptual framework for identifying, examining, and shaping the full potential role of transport operations in reducing poverty.

A key finding of the paper is that there is a need to strengthen the direct role of transport interventions in poverty alleviation. This will require building far better knowledge of the transport needs of the poor, and how these needs are best met. In this regard, a set of structured case studies should be designed and undertaken as a follow-up to this paper, with the objective of establishing best practice guidelines to assist task managers in the identification, design, and assessment of transport project components intended to assist the poor.

During the preparation of this paper, the authors benefited from spirited discussions on the topic among participants of a Bank workshop and the 1997 Transport Forum. In particular, the authors wish to thank Professors Angus Deaton, Edwin Mills, and Jonathan Morduch for their helpful comments on earlier drafts. The authors are also grateful to several Bank colleagues for constructive suggestions, and especially to Kenneth Gwilliam, Jerry Lebo, Slobodan Mitric, Thampil Pankaj, and Graham R. Smith for their detailed comments. The assistance of Joanne Lucas-Walker and Charles Schneider in the production of the paper is gratefully acknowledged. The views expressed are, of course, the responsibility of the authors.

EXECUTIVE SUMMARY

The Role of Transport in Poverty Alleviation

- i. More than 1.3 billion people in the developing world currently exist on less than one U.S. dollar per day.
- ii. The overarching objective of the World Bank is “to reduce poverty through sustainable economic development.”
- iii. The most important question that should be addressed within the transport sector is: How can transport operations best contribute to poverty alleviation?

To Place the Role of Transport in Perspective, Indirect and Direct Approaches to Poverty Reduction should be Kept in Mind

- iv. Indirect approaches involve increasing the efficiency of resource allocation, especially the performance of markets, the flexibility of adjustments, and the fostering of economic growth.
- v. Direct approaches are concerned with enhancing human capital formation, especially education and health, and improving access to economic and social opportunities, including labor and product markets, schools, and clinics.
- vi. Typically, indirect approaches operate at the level of improving *overall mobility*, while direct approaches operate at the level of improving *basic access* for the poor.

Economic Efficiency is, and should Remain, the Primary Objective of Transport Sector Operations

- vii. Transport is an *intermediate* service—it is a means to an end. Transport alone cannot reduce poverty, but it serves a pervasive and crucial complementary role.
- viii. Transport reduces *absolute* poverty mainly by increasing economic efficiency—by lowering costs and prices and enhancing opportunities.
- ix. Transport has no special claim as a cost-effective policy instrument for the redistribution of welfare to the poor.
- x. Transport sector operations need not be focused on poverty; however, explicit attention to poverty issues and consideration of specific poverty components should be substantially expanded.

The Efficiency Criterion may Orient Decisions away from Helping the Poor

xi. Efficiency-oriented transport development may benefit the rich more than the poor, and in some cases, may hurt the poor.

- Measurement of benefits and costs based on monetary willingness-to-pay, as registered through the market system, tends to favor higher-income groups.
- Exclusive focus on the efficiency criterion tends to neglect the needs of the poor.
- Orientation toward efficiency leads to a higher dependence on motorized transport which tends to displace infrastructure for non-motorized transport, to the disadvantage of the poor.
- Rights-of-way are often imposed on poor communities for high mobility projects that may not benefit the poor of these communities directly.

xii. Commercialization in the transport sector may lead to higher prices for services that previously were affordable to the poor.

xiii. The short-term and long-term distributive impacts of transport projects, particularly on low-income groups, are not well understood. Information on these impacts needs to be established. It should be displayed in a balance-sheet type of format, for consideration by decision-makers, as an adjunct to a project's conventional cost-benefit assessment.

xiv. Distributional judgments should be resolved through government or political processes and *not* as an internal part of the professional or technical project assessment, for example, modification of market-based measures of benefits and costs by assigning different distributional weights to the gains and losses accruing to different social or income groups.

Transport Needs of the Very Poor should be Recognized

xv. High-cost transport means geographical, social, and economic isolation which is especially a handicap to the poor.

- In poor rural areas, lack of adequate, reliable transport penalizes households pursuing cash crop farming, nonfarm employment opportunities, and access to social services.
- In urban areas, poor neighborhoods often suffer from the lack of affordable access to public transit or physical and regulatory barriers to entry by informal transport services.

xvi. Transport access is *complementary* to the availability of other basic "merit" services such as health care and education. The effectiveness of direct service assistance strategies depends significantly on the accessibility of the poor to those services.

xvii. Mechanisms for the poor to voice their transport needs are typically weak and should be improved, especially at the local level. Approaches include surveying existing problems

and needs, establishing explicit participation in collaboration or partnership with NGOs, and enabling expression through open markets.

The Role of Transport in Poverty Reduction through Direct Interventions is Important, but Requires Careful Design

xvi. Much can be done in rural transport to help the rural poor, but it is less clear how to use transport as an effective direct policy instrument to help the urban poor.

xvii. Transport subsidies are widely used as a direct intervention to help the poor, especially in urban areas. However, transport subsidies are difficult to effectively target and vulnerable to misuse and capture by the wealthier parts of the population, and often not financially sustainable.

xviii. Labor-intensive methods in road work, where relatively low wages make them cost-effective, provide a sustainable source of supplementary employment for the poor, especially in rural communities.

The Impacts of Market Failure and Government Interventions are Predominantly Regressive

xxi. Transport externalities, such as vehicle emissions and traffic accidents, appear to harm the poor more than the rich. However, the evidence is limited and more systematic studies are needed.

xxii. Government regulations, such as barriers to entry for the informal sector to urban transport markets and imposition of service standards, seriously remove viable opportunities for the provision and use of affordable services by the poor.

xxiii. Land-use zoning may create barriers to residential location choice. Relaxation of these constraints may enable locational adjustment and thereby reduce transport costs, especially for the poor.

Public Transit Subsidies are a Blunt Instrument to Help the Urban Poor, and to be Justified, Require Very Careful Design

xxiv. It is difficult to target the poor.

xxv. Subsidies may weaken transit operators' incentive for cost control, expose opportunities for rent-seeking, and become unsustainable.

xxvi. If subsidies are justified, the use of lump-sum subsidies, user-based vouchers, or basic service assistance should all be subject to careful design, monitoring, and periodic re-assessment.

xxvii. Market structure is a crucial determinant of the effectiveness of transport subsidies; the more competitive the markets for transport services and land, the greater the retention of subsidy by low-income users.

Treatment of Poverty Issues in the World Bank's Transport Sector Operations Should Be Improved

xxviii. At present :

- Transport is rarely considered as an explicit part of Bank's *direct* poverty alleviation strategies.
- Transport tends to be treated as having only an *indirect* relationship to poverty, primarily through improvements in technical and allocative efficiency.
- There are no guiding principles for, or systematic approaches to, poverty issues in transport sector operations.

xxix. Improvements should include:

- Basic efforts to identify the poverty profile of the population affected by the project (including users), to assess the relevant market structures, and to estimate the likely distributive impacts
- Project designs that, where appropriate, incorporate the needs of the poor, and minimize or compensate for adverse impacts on the poor
- Efforts to build on the innovative actions already underway in rural transport projects to help the rural poor, especially in terms of providing sustainable reliable road access (in particular, systematic study of rural road passability and closure is needed)
- Expanded use of the Living Standards Measurement Study (LSMS) to help the identification and evaluation of the transport needs of the poor and the impact of transport projects on the poor
- Establishment of best-practice methodologies for the evaluation of transport components targeted at the poor, for example, non-motorized transport (NMT), safety, and basic access
- More systematic integration of transport components with other sectoral interventions (for example, in education and health) so as to strengthen poverty reduction strategies.

The Poor can Benefit from Transport Projects, but Success Lies in the Details of Project Design

xxx. Attention to country- or region-specific poverty issues, together with a good understanding of culture, is the starting point for developing design details.

xxxi. The cost of assembling basic poverty data, in conjunction with transport project components, is typically modest, but the social benefits to the poor, and particularly to the women and children in poor households, are potentially very high.

xxxii. Good examples of the direct approach to poverty reduction in World Bank transport sector operations exist, but they are limited: good practices should be explicitly established and extended.

Poverty Components of Projects should be Considered Separately from Efficiency Components in Project Economic Evaluation

xxxiii. Poverty and equity components should be considered part of a socially balanced transport system.

xxxiv. Poverty components often involve a small investment cost; in such cases a basic justification of what is needed (sidewalks, bicycle accommodation) is more appropriate than a full cost-benefit analysis.

Monitoring the Impact of Transport Interventions on Poverty Reductions should be Improved and Expanded

xxxv. Little evidence exists on the direct impact and final incidence of net benefits of transport projects. A systematic effort is needed to undertake case studies to improve our understanding.

xxxvi. Much remains to be learned about the *dynamic* links between transport and poverty, particularly in the areas of regulation, subsidy, and cost-effectiveness of transport interventions compared with other sectoral interventions (for example, in education and health care).

xxxvii. The final results of transport investment tend to have a long gestation period. Therefore, actions to devise low-cost mechanisms for monitoring should be developed early in project preparation. The international breadth and depth of the Bank's experience provides the Bank with a substantial comparative advantage to make a contribution to the understanding of the links between transport and poverty.

1. INTRODUCTION

1.1 Poverty reduction is the World Bank's overarching objective. It will remain so since poverty persists as a pervasive and devastating condition in most developing countries. Poverty has many root causes. While it is primarily related to very low-incomes, it is manifested in many dimensions, especially malnutrition, ill health, and illiteracy. Attempts to alleviate poverty basically follow two broad approaches: indirect and direct. The indirect approach relies on broadly based economic growth to generate income-earning opportunities for the poor, while the direct approach targets assistance to the poor for their specific basic needs, especially food, health care, and education.

1.2 Because both approaches to poverty reduction require adequate means of moving people and goods, transport development becomes a crucial complementary factor in the process of poverty alleviation. Accordingly, transport is an important sector in the World Bank's lending operations and its policy dialogue with borrowing member countries. Annual lending for the sector has remained steady at between 12 and 15 percent of overall Bank lending over the past decade. Currently, the number and value of transport projects as a share of the active portfolio is second only to agriculture and rural development.

1.3 While the importance of the transport sector in economic and social development has long been recognized, transport sector operations are rarely considered part of the Bank's *direct* interventions for poverty alleviation. Bank operations in other sectors such as agriculture, education, health, and water and sanitation infrastructure are constantly emphasized for their direct role in poverty reduction.¹ Transport tends to be viewed as contributing to poverty reduction only *indirectly*, that is, through its contribution to economic growth.

1.4 This view of transport may account for the very limited treatment of poverty issues in the Bank's transport sector operations in general, and transport project design in particular. A 1995 Bank operations evaluation report indicated that there was little formal accounting for poverty in the Bank's transport operations.² Also, a recent transport sector policy review paper recognized a need to improve the treatment of poverty issues in the Bank's transport

¹ Other operations such as sector adjustment loans and social funds target their components directly to the low income people and assist the provision of social safety nets.

² World Bank (1995), *A Review of the Quality of Economic Analysis in Staff Appraisal Reports for Projects Approved in 1993*, Operations Policy Department and Operations Evaluation Department. The report gave staff's use of poverty analysis low ratings. Although the sample of transport projects analyzed received "high quality" marks for general economic analysis (80 percent), almost two-thirds of the staff appraisal reports were considered to have failed to provide sufficient evidence to ascertain what share of project benefits were expected to reach the poor. More generally, there was little accounting for the incidence of costs and benefits (or even the income levels of expected beneficiaries). Even qualitative analysis of explicit poverty impact was very limited.

sector operations, and to incorporate strategies and investments into Bankwide efforts at poverty alleviation.³

1.5 Ideally, distributive justice in general, and poverty reduction in particular, should be addressed at the macro-economic level through a tax system that is capable of efficient redistribution. If such a tax system is in place, there should be little concern with the distributive impact of projects at the sector level. However, the reality is that in many developing countries, the national tax system does not function in an effective manner: it is often incomplete, slow, and costly.

1.6 Against this background, how can the Bank's transport sector operations be improved to better assist the lowest-income groups and to better account for their impact on the poor? This is an important question, because poverty alleviation is the primary benchmark by which the essential contribution of the Bank is measured. This paper addresses this question by reviewing the major direct and indirect mechanisms through which transport can assist low-income groups and by suggesting ways in which attention to poverty issues in the transport sector operations can be improved.

1.7 Specifically, this paper attempts to (a) summarize current knowledge of the links between poverty and transport; (b) identify good practice with respect to the role of transport in an overall poverty alleviation strategy; (c) define the role of the Bank in developing and implementing actions to address poverty issues in transport operations; and (d) suggest avenues for collaboration with other stakeholders in the sector (users, suppliers, governments, non-governmental organizations, and community groups) to increase "grass-roots" understanding and improve the effectiveness of actions to reduce poverty and its consequences.

1.8 The following text is divided into five sections. Section 2 discusses how transport contributes to poverty reduction through its impacts on economic growth and personal welfare. Section 3 discusses the nature of efficiency and equity considerations in transport investment decisions. Section 4 examines the distributive impacts of transport investments and policies, with special attention to the possible adverse impacts of transport operations on the poor. Section 5 identifies the possible areas for direct interventions to serve the transport needs of the poor. Finally, Section 6 discusses the treatment of poverty issues in the transport sector operations and suggests a general operational framework within which the Bank might improve the poverty reduction impacts of its transport lending operations.

³ World Bank (1996), *Sustainable Transport: Priorities for Policy Reform*.

2. THE ROLE OF TRANSPORT IN POVERTY REDUCTION

2.1 The process of poverty reduction is embedded in a broad range of socio-economic activities to which transport services provide intermediate inputs. This section examines the links between poverty and transport by reviewing the impacts of transport on economic growth at the macroeconomic level, and on personal welfare of the poor at the microeconomic level. The aim is to provide an appreciation of the process by which the benefits of transport improvements can be expected to reach the poor.

Approaches to Poverty Reduction

2.2 Poverty can be measured in absolute and relative terms. *Absolute* poverty is defined with a minimum subsistence level. For example, a poverty line specifies a dollar amount necessary to sustain livelihood (primarily minimum nutrition). It is also characterized by many non-income conditions such as malnutrition, ill health, illiteracy, and lack of access to basic social services. The extent of absolute poverty for a country or a region can be defined by the number or fraction of people living below the poverty line. An individual is regarded as poor if his or her income falls below the poverty line. *Relative* poverty is about where people at the bottom stand relative to people elsewhere in the income distribution, usually around the middle. A relative poverty measure might be the fraction of the people with income less than half of median income.⁴

2.3 Reduction of absolute poverty can be achieved either directly through income redistribution or indirectly through per capita income growth. The *direct* approach focuses on the provision of basic education, nutrition, health, and access to employment and product markets for the poor. It arises from recognition that the very poor generally do not have sufficient resources to meet basic human needs and, because of their lack of human capital, in many cases they may not be able to take adequate advantage of the economic opportunities generated by national economic growth. Direct interventions to assist the poor can vary from being essentially re-distributive transfers to being warranted on efficiency grounds alone.

2.4 The *indirect* approach addresses poverty through investments and policies that foster economic growth, enhance the performance of markets, facilitate flexibility of adjustments, and increase the efficiency of resource allocation.⁵ Gains from overall growth of GNP and

⁴ *Relative poverty* is conceptually different from *relative income* inequality. The latter is associated with the distribution of assets and incomes within a society at a particular point in time. The Lorenz curve and Gini-coefficient, which measure the income gap between the poorest and richest groups, are often used to measure the extent of relative income inequality.

⁵ A variety of processes contribute to economic growth, including improving efficiency of markets. At the same time, some efficiency improvements (for example, deregulation) may have a *direct* effect on poverty alleviation; for example, removing barriers to entry to "informal" transport services that are attractive to low-income potential passengers may have an immediate effect (one-step linkage).

per capita income are expected to bring benefits to the population as a whole including the poor in the forms of jobs and other economic and social opportunities. A large body of empirical evidence shows that sustained national economic growth generally contributes to the alleviation of absolute poverty.⁶

2.5 Poverty reduction policies are heavily affected by the relative emphasis that a country attaches to promoting growth and raising the real incomes of the poor. The relative emphasis has much to do with the severity of poverty, levels of national incomes, and the nature of the political process for public choices. Therefore, the combination of the two approaches varies country by country and is highly influenced by the specific circumstances at a particular point in time.

Transport Development and Poverty Reduction

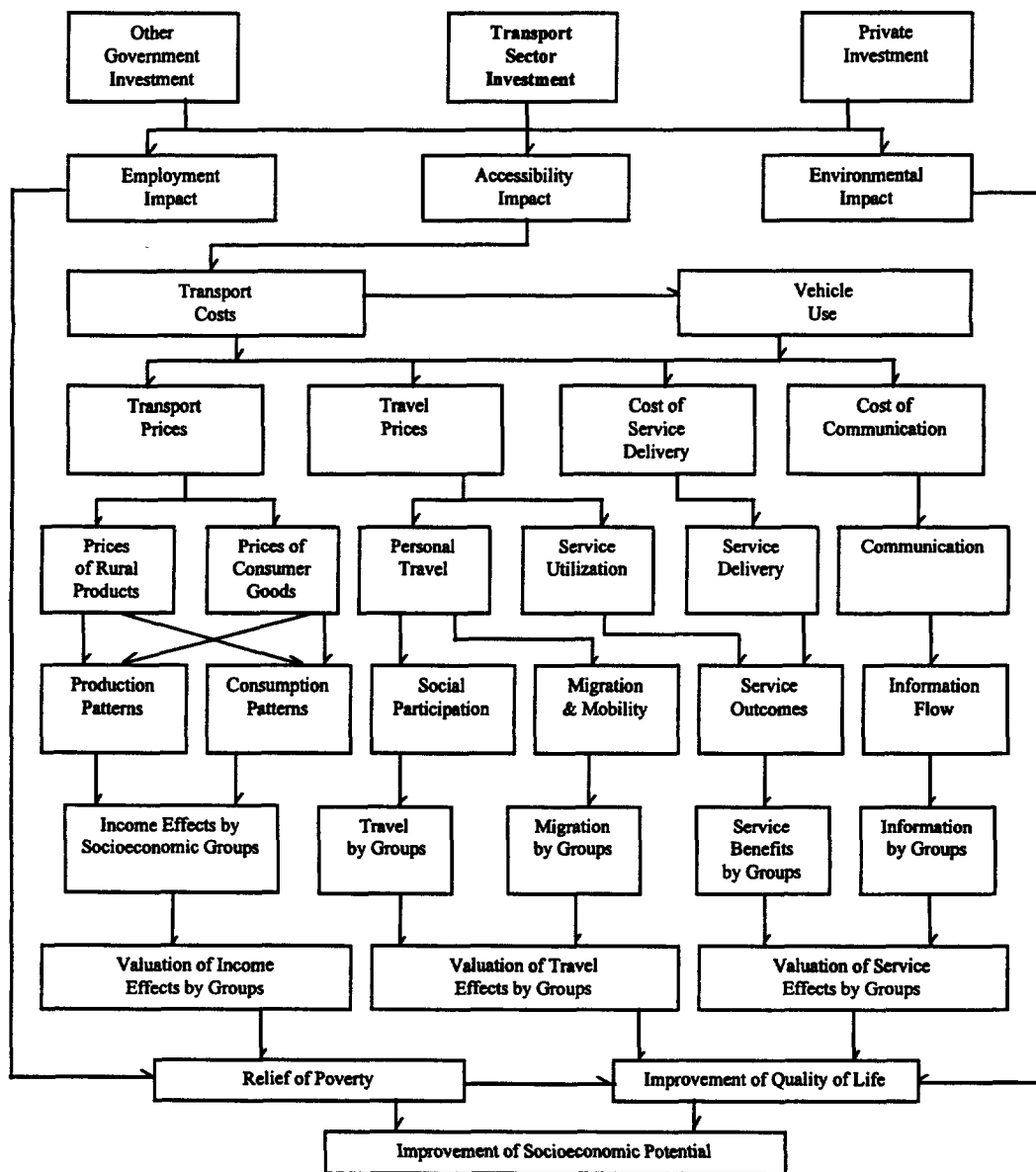
2.6 In line with the direct and indirect approaches to poverty reduction, development projects in the transport sector can roughly be divided into three categories: (a) projects that focus on poverty, (b) projects oriented toward efficiency and growth, and (c) efficiency- and growth-oriented projects with components that focus on poverty. The concern of this paper is a more detailed understanding of how transport improvements, either focused on poverty or on growth, contribute to poverty reduction.

2.7 In general, a transport project is expected to contribute to poverty reduction through its indirect impacts on economic growth or its direct impact on personal welfare of the poor. What exact impact the project would have on poverty reduction hinges on both the type of infrastructure or services and the areas and people the project serve. It also depends on the operating environment of the project, particularly market structures and government regulations. In general, local access roads in poor rural and urban areas make only a modest contribution to national income growth, but they are likely to have a direct and significant impact on the daily life of the poor. On the other hand, inter-city transport modes such as trunk roads, rail and shipping are of strategic significance to a national economy. They are provided with the objective to stimulate and facilitate national income growth; their impacts on poverty reduction are likely to be indirect.

2.8 The process through which the benefits of transport investments and policies lead to improvements in the standard of living of the low-income groups often involves many links, and the final general equilibrium outcomes and incidence pattern across various groups are very difficult to predict. To get some idea of the key relationships, a somewhat simplified process is illustrated by Figure 2.1. Investment in the transport sector improves access to

⁶ World Bank (1980), *Poverty and Human Development*, Oxford University Press, pp. 3-4; World Bank (1990), *World Development Report 1990: Poverty*, Oxford University Press, pp. 46-48. A recent World Bank study examined the trends of poverty and growth in India over forty years, and found that aggregate economic growth was the primary determinant of long-run reduction of absolute poverty and that redistribution played a secondary role. For a summary of this study, see Martin Ravallion (1996), "Poverty and Growth: Lessons from 40 Years of Data on India's Poor," World Bank, *DEC Notes*, No. 20.

Figure 2.1. Economic Impacts of Transport Investments



Source: Louis Berger International, Inc. (1979), *Study of Transport Investment and Impact on Distribution of Income in Remote Area: Phase I, A* report prepared for the United States Agency for International Development, p.1-17.

economic opportunities by reducing transport costs. Provided transport market structures are reasonably competitive, this will be reflected in a reduction in prices for both freight and passenger services. Again, under competitive conditions, significant predictable consequences will result. These include lower market prices for final products (both rural products and consumer goods), spatial extension of the market (due to the transport-induced changes in production and consumption patterns), higher personal mobility, and stimulation

of socio-economic activities. In general, this dynamic process can be expected to benefit *all* income groups in society in the form of real income effects and increased opportunities.⁷

2.9 In addition to improving accessibility, transport investment affects employment. The provision of transport services, including the construction and maintenance of transport infrastructure, generates demand for labor (often unskilled labor) and provides income-earning opportunities for the poor. If a transport project generates jobs for the poor who are otherwise unemployed or under-employed, it contributes to the reduction of poverty. In many developing countries, the construction aspect of transport sector development is often viewed equally as important as the service aspect of the sector in promoting economic growth.

2.10 Finally, it must be aware that transport may have adverse impact on the poor. For example, transport investment typically involves some environmental impact. If the effect is negative, the poor are the least able to respond, adjust or compensate; they may be the most vulnerable and the most "at risk."

Impacts of Transport on Economic Growth

2.11 Sustained economic growth generally contributes to the alleviation of absolute poverty. Therefore, understanding the role of transport in economic growth is central to an appreciation of the role of transport in poverty reduction.

2.12 Transport provides intermediate services to facilitate interactions between productive activities. The micro-economic mechanisms through which the benefits of transport investment are translated into income growth are quite well recognized.⁸ Transport investment reduces the cost of assembling intermediate inputs for production (raw materials, energy, labor, other intermediate products, and information) from different locations, directly reducing the cost of production. Reduced cost and improved quality in transport services also reduces the delivered price of products and hence promotes regional and international trade, making it possible for agriculture to commercialize, for industry to specialize, and for production and employment to expand by exploiting scale economies. Transport investment contributes to economic diversification as well, which enables exploitation of economies of scope and increases the economy's ability to handle risks. In a multitude of ways through these mechanisms, transport contributes to economic growth.

⁷ Of course, this does not imply that all individual members of all income groups benefit; the average income for each group may rise but real income for some individuals may fall.

⁸ For more detailed discussions, see Christine Kessides (1993), *The Contributions of Infrastructure to Economic Development: A Review of Experience and Policy Implications*, World Bank Discussion Papers No. 213; and Cavelle D. Creightney (1993), *Transport and Economic Performance: A Survey of Developing Countries*, World Bank Technical Paper No. 232, Africa Technical Department Series.

Leading Role vs. Complementary Role: A Historical Perspective

2.13 While the importance of transport in economic growth is readily accepted, its exact role and impact has long been a subject of debate. Much of the debate has centered around the question of whether transport plays a *leading* role or a *complementary* role in economic growth. Transport plays a leading role when transport investments stimulate economic growth through their market widening effect. Transport plays a complementary role when transport investments are required to serve the growth in demand. From a historical perspective, transport may play a leading role or a complementary role in promoting economic growth, depending on the stage of economic development and the incidence of technological innovations in transport.

2.14 Both roles may coexist, but they shift in relative importance with the accumulation of the transport capital stock. Transport may play a leading role at the early stage of economic development when the initial stock of transport capital is small. This role may prevail for an extended period of time, but gradually diminishes with the accumulation of the transport capital stock. When the economy becomes highly industrialized and a large stock of transport capital is in place, the leading role of transport may give way to the complementary role. Even in an advanced stage of economic development, transport may lead growth again if there is major technological innovation that contributes substantially to market extension or the formation of new market. For example, highway development offers an alternative to rail and waterway freight transport, and makes it possible for modern manufacturing industries to relocate.

2.15 Testing the above hypothesis is important because it may shed light on the policy question of whether transport investment should precede or respond to the activities resulting from economic growth. The hypothesis can be tested through empirical analysis of the causality between transport investment and economic growth. Transport investment leads economic growth if it is found to cause economic growth. Transport complements economic growth if economic growth is found to increase demand for transport. However, empirical findings from relevant studies on this matter tend to be inconclusive. This is not surprising because the causality can be expected to run in both directions, given the intermediate market role of transport services and the lumpy nature of transport infrastructure.

2.16 Nonetheless, numerous arguments over the years have greatly enriched the understanding of the role of transport in economic growth. Some economists have maintained that transport investment was a key determinant of economic growth in industrialized countries during their formative years of industrialization.⁹ Other economists

⁹ See Albert Fishlow (1965), *American Railroads and the Transformation of the Ante-bellum Economy*, Harvard University Press; and W.W. Rostow (1960), *The Stages of Economic Growth*, Cambridge University Press. According to Rostow, "...the introduction of railroads has historically been the most powerful single indicator to take-offs. It was decisive in the United States, France, Germany, Canada and Russia." However, experience from China and India, where railroad networks are relatively extensive, suggests that the role of railroads is unclear; it is heavily affected by more complex processes involving factor endowments, alternative modes, and institutions. Regarding the role of railroads in American

cautioned that it would be risky and economically wasteful if large transport investment was made ahead of economic growth in an expectation that the investment would lead growth.¹⁰ While the question of leading role vs. complementary role is still largely unsettled, there is a strong consensus that good transport is a necessary condition, but not a sufficient condition, for economic growth, and economic growth increases demand for transport.

An Overview of Empirical Evidence

2.17 A large number of the empirical studies confirm the strong links between transport and economic output, growth, and general welfare. These studies are mostly supported by a host of stylized facts, such as the positive correlation of per capita GNP with passenger and freight transport volumes.¹¹ However, there are few comprehensive empirical studies that measure the separate contribution that transport development has made to a particular country's economic growth. A major reason lies in the methodological difficulties involved in trying to measure the capital stock of the transport sector. Largely for this same reason, most of the more rigorous empirical analyses¹² have been done at a highly aggregate level using national or industry-wide variables (for example, aggregate public capital investment).

economic growth, a different view was offered by Robert Fogel (1964), *Railroads and American Economic Growth, Essays in Econometric History*, Johns Hopkins Press. Fogel argued that American economic growth in the 19th century would have been possible without the railroads. It should be noted that Fogel addressed the question whether rail transport investment was *indispensable*, instead of the question whether rail transport investment was economically viable. In another study, Fogel estimated the annual social rate of return on the capital expended on the construction of the Union Pacific Railroad to be at least 30 percent during 1870-79. He attributed the high social rate of return partly to the increase in national income brought about by the increase in the productivity of labor and capital when utilized on lands opened up for commercial exploitation by the railroad. See Robert Fogel (1960), *The Union Pacific Railroad*, Johns Hopkins Press.

¹⁰ A.O. Hirschman (1958), *The Strategy of Economic Development*, Yale University Press. A somewhat similar view was offered by Gerald Kraft, John R. Meyer, and Jean-Paul Valette (1971), *The Role of Transportation in Regional Economic Development*, D.C. Heath and Company. They argued that the lack of development in stagnant economies was much less likely due to inadequate transport than to a shortage of other factors such as labor, location, and agglomeration.

¹¹ For example, Wilfred Owen (1987), *Transportation and World Development*, Johns Hopkins University Press, Table 3, p. 10. Using a cross-country comparison of the levels of passenger and freight transport with per capita income, Owen demonstrated that the level of mobility in a country roughly reflected the level of the country's wealth.

¹² For example, David Aschauer (1989), "Is Public Expenditure Productive?" *Journal of Monetary Economics*, Vol. 23, pp. 177-200; David Canning and Marianne Fay (1993), "The Effect of Transportation Networks on Economic Growth," Discussion Paper, Department of Economics, Columbia University; Douglas Holtz-Eakin (1992), "Public Sector Capital and the Productivity Puzzle," NBER Working Paper No. 4122; and M. Ishaq Nadiri and Theofanis P. Mamuneas (1996), *Contribution of Highway Capital Infrastructure to Industry and Aggregate Productivity Growth*, A report prepared for the Federal Highway Administration Office of Public Development, Work Order No. BAT-94-008.

These studies have attempted to estimate the impact on economic performance of infrastructure investments (mostly in the form of public infrastructure expenditures), where transport was a major component.

2.18 In general, these studies find that public infrastructure capital (including transport) has a significant, positive effect on economic growth. Where infrastructure appears to lead economic growth, the effect seems to be indirect and relatively long term. The aggregate analysis used in these studies, however, does not permit the identification of the necessary conditions for this positive effect to occur, nor does it permit development of specific guidelines for policy.¹³

2.19 The positive effect found in these studies should be taken as suggestive only. Many transport investment projects yield a high rate of return because these projects are highly selective. Projects with a low return may result from bad decisions. It should be noted as well that across countries there are wide variations in the estimated contribution of public infrastructure expenditures to economic growth.¹⁴ This is not surprising because current empirical models and specifications fall short of controlling for other factors so as to identify the separate contribution of infrastructure. Thus, the findings should be interpreted in the context of the particular places where the data were gathered. Despite the divergence in these findings, it is generally accepted that the role of transport infrastructure in economic growth is significant, positive, and substantial.

Rural Transport

2.20 The impact of transport on productivity is somewhat different in rural and urban areas in terms of the micro-economic mechanisms. Transport plays a pivotal role in promoting agricultural production and commercialization. This is most easily appreciated in terms of the von Thünen theory of the location of agriculture land use.¹⁵ Transport improvements reduce the cost of shipping agricultural products to market and extend the distance to break-even locations, thereby expanding the area of land under cultivation, and expanding the production of exports. Moreover, transport improvements reduce production costs by lowering the delivered price of inputs, including capital and information (the latter by facilitating increased speed of know-how and technological diffusion). Consequently, they increase net farm gate prices and raise farmer incomes, although the extent hinges on the competitiveness of the transport service market.

¹³ Christine Kessides (1993), *op. cit.*

¹⁴ World Bank (1994), World Development Report 1994: *Infrastructure for Development*, Oxford University Press, p. 14 and Box 1.1.

¹⁵ Johann Heinrich von Thünen (1826), *Der Isolierte Staat in Beziehung auf Landwirtschaft und Nationalökonomie*, Hamburg.

2.21 These impacts are confirmed by various impact studies, three of which are noted here. The first study was based on a survey of 129 villages in various parts of Bangladesh.¹⁶ The study categorized the villages into two groups based on an aggregate index developed to reflect the ease of access of a village to various services such as markets, schools, banks, and local administrative offices. Villages with better access were found to be significantly better off in a number of areas including agricultural production, household incomes, wage incomes of landless labor, health, and the participation of women in the economy.

2.22 The second study used data from eighty-five randomly selected districts of India to examine the role of rural roads, among other factors, in agricultural investment and output.¹⁷ The study found that road investment contributed directly to the growth of agricultural output, to increased use of fertilizer, and to commercial bank expansion.

2.23 The third study examined the socio-economic impacts of improvements to rural roads in Morocco.¹⁸ The study compared conditions in the areas of the project roads, five to ten years after project completion, to the situation prior to the improvements ("before-after" the project), and to the conditions in comparison roads that were located nearby and were not subject to improvements during the project period ("with-without" the project). The study found that the benefits of paving rural roads extended considerably beyond the improvement of road use efficiency in terms of lower cost and higher quality. The extended benefits included major changes in the agricultural economy, including higher outputs, transformation of the agricultural output mix from low-value cereals to high-value fruit orchards, and increased use of modern inputs, especially fertilizers. Moreover, improved access to education and health facilities increased enrollment rates in rural schools, as well as the frequency of visits to health care services, and enabled the recruitment of professional personnel to staff schools and health facilities. Again, positive feedback from higher rural incomes may have contributed to reverse causality.

Urban Transport

2.24 In urban areas, social and economic interactions are much more spatially intensive than in rural areas. Housing, jobs, and public facilities are located in proximity in order to take advantage of the economies of agglomeration. Most of the urban activities have a distinctive daily cycle. This close proximity of activities, both in location and timing,

¹⁶ Raisuddin Ahmed and Mahabub Hossain (1990), *Developmental Impact of Rural Infrastructure in Bangladesh*. Research Report 83, International Food Policy Research Institute, in collaboration with the Bangladesh Institute of Development Studies.

¹⁷ Hans Binswanger, Shahidur Khandker, and Mark Rosenzweig (1993), "How Infrastructure and Financial Institutions Affect Agricultural Output and Investment in India," *Journal of Development Economics*, Vol. 41, pp. 337-366.

¹⁸ Hernan Levy (1996), *Kingdom of Morocco—Impact Evaluation Report: Socioeconomic Influence of Rural Roads*, Operations Evaluation Department, World Bank.

requires a highly efficient transport system. When an urban transport system becomes deficient, urban productivity declines and the standard of living for urban residents worsens.

2.25 Because transport cost is a key determinant of locations of urban activities, transport improvements can expand the location choices of both firms and households. In particular, transport improvement can help improve the competitiveness of small firms and can facilitate the entry of new firms into a market.¹⁹ Transport improvement also increases the efficiency of operation of the labor market and labor participation rates. The combination of these factors increases urban productivity and urban household incomes.

2.26 The rapid urbanization and income growth in developing countries have generated a great deal of pressure on urban transport infrastructure. This results in serious traffic congestion. Congestion increases transport costs for both freight and commuters. Higher cost for freight transport and higher commuting cost that requires employers to pay higher wages both increase production costs. While providing adequate access is the major task in rural transport, improving transport efficiency is perhaps the major issue in urban transport.

Importance of Access for the Poor

2.27 Transport has direct impacts on the personal welfare of all income groups. It is generally accepted that access to at least minimal infrastructure services is one of the essential components of personal welfare. Improvements in transport not only provide people with more convenient access to a broad range of socio-economic opportunities, but also have strong income effects by lowering transport cost and hence the prices of consumer goods and services. In these ways, transport exerts a pervasive contribution to the improvement in personal welfare. Understanding the transmission of these impacts is especially important in assessing transport's direct contribution to poverty reduction.

2.28 Transport's impact on personal welfare may be best assessed by examining closely how transport affects people's daily activities. People make trips to workplace, to school and to the locations of social services. Since income is the dominant determinant of individual travel behavior, more trips per person, longer average trip distance, and faster and more comfortable modes of transport are all associated with rising incomes. As incomes grow, people are able to afford access to more employment opportunities and more social interactions. Given normal preferences for these activities, demand for travel increases.

¹⁹ Kyu Sik Lee and Alex Anas (1989), *Manufacturers' Responses to Infrastructure Deficiencies in Nigeria: Private Alternatives and Policy Options*, World Bank, Infrastructure and Urban Development Department Report No. INU 50; Kyu Sik Lee (1985), *An Evaluation of Decentralized Policies in Light of Changing Location Patterns of Employment in the Seoul Region*, World Bank Urban Development Discussion Paper UDD-60; and Kyu Sik Lee (1989), *The Location of Jobs in a Developing Metropolis: Patterns of Growth in Bogota and Cali, Colombia*, Oxford University Press. These studies found that public infrastructure deficiencies increased the cost of production for manufacturing firms (particularly small firms), and that city centers with good quality transport and other infrastructure services attracted small- and medium-sized firms.

2.29 For the poor, the lack of affordable access deprives them of the ability to take advantage of job opportunities and even of very basic social services. Reliable access to schools and health services for the poor contributes directly to their accumulation of human capital, which is a key factor in sustainable poverty alleviation. In as much as jobs and basic social services are relatively highly valued by the poor, it can be said that the associated basic transport access is of high value to the poor. In this sense, improvements in transport conditions can have greater welfare implications for the poor than for the rich.

2.30 Transport conditions for the poor in many developing countries are far from adequate. For example, the rural poor often have extremely limited mobility beyond their immediate settlement due to geographical isolation and the high cost of motorized transport. As a result the poor are not able to take advantage of employment opportunities, such as seasonal work, beyond their settlements. Adequate access to the outside world provides mobility for these opportunities. Moreover, an adequate transport network reduces regional variations in food prices and the risks of famine by facilitating the movement of food from surplus to deficit areas. For farmers in general, improved rural transport can also ease the introduction of improved farming practices and the transition from subsistence farming to cash crops and a market economy. Transport improvements also lower the costs of inputs such as fertilizer. Reliable access (all weather passability) to input and output markets can stimulate higher cash-crop farming production and more stable incomes, and enable the poor to improve their management of risks. Rural transport improvement can benefit urban populations as well. For example, by lowering the cost of rural (and rural to urban) transport, a reduction in food prices for the urban poor can be achieved.²⁰

2.31 Access to job opportunities in urban areas, including by non-motorized transport, is necessary for the poor to participate in most income-earning activities. In many developing countries, the urban poor are concentrated on the periphery of urban areas which is far from their workplaces. Many poor workers take several part-time, low-paid jobs at different locations, simply to maintain the very basic level of household income. Many school children have to help their poor parents after school hours to raise household income. Their ability to obtain employment and education is highly dependent on the costs and availability of public transport. Because residential relocation is often very difficult for the poor due to high moving costs and lack of affordable alternative locations, providing affordable public transport can have an immediate impact on the personal welfare of the urban poor.

Summary

2.32 An overall strategy for poverty reduction should be formulated in terms of a two-pronged approach: broadly based economic growth to generate income-earning opportunities for the poor and targeted interventions to meet the basic needs of the poor. In general, these define both the indirect and direct approaches to poverty reduction. Within this framework, transport interventions provide a very valuable policy instrument for poverty reduction. A

²⁰ World Bank (1994), *op. cit.*, p. 20.

transport investment project may foster economic growth, or target the transport needs of the poor, or directly generate employment opportunities for the poor. In any of these ways, the project contributes to poverty reduction.

3. EFFICIENCY AND EQUITY IN TRANSPORT OPERATIONS

3.1 The role of a transport project in poverty reduction is more obvious if the project serves a poverty-stricken area where the majority of beneficiaries are the poor. Except in rare cases, however, transport projects do not serve a homogenous population. When a project affects both the rich and the poor, it is important to understand the distribution and final incidence of costs and benefits among income groups. Many transport projects have high rates of return, but little direct impact on the poor. If a project with high rate of return affects the poor adversely, the project's politically judged contribution to social welfare may warrant careful review.

3.2 Operationally, the evaluation of a transport project's contribution to poverty reduction requires a "predictive handle" on distributive impacts. It also requires the adoption of a criterion for welfare improvement to a particular income group.²¹ Little is known, however, about the final incidence of gross or net benefits of transport projects by income groups. Given the presence of imperfect markets, government ownership, and regulation, there is no relevant compact theory with which the distributive outcomes of transport improvements can be predicted—especially where the conditions for highly competitive and complete markets simply do not hold. Notwithstanding this, it is useful to establish a general conceptual framework for evaluating the impact of transport on poverty reduction under several possible scenarios.

Distributive Impacts: A Taxonomy of Scenarios

3.3 As a point of departure, suppose the area and population affected by the project, including the level of poverty, have been surveyed and satisfactorily identified, and a model is available to measure the levels of project benefits (both direct and indirect) that will accrue to different income groups.²² Moreover, suppose the project is estimated to bring net benefits to the economy as a whole. At this basic level, six possible scenarios for the net benefit distribution, grouped into two major categories (win-win and win-loss scenarios), are defined as follows:

The Win-Win Scenarios:

- *Neutral:* The project benefits different income groups proportionately, and income distribution with the project does not change significantly compared with that without the project.

²¹ For the purposes of the present discussion, income groups are not operationally defined. However, it may help to think in terms of the "lowest" income group as corresponding to the lowest quintile or, to be more consistent with the use of absolute poverty, the group below an absolute poverty line.

²² Empirically, if not methodologically, there is often a question as to whether or not the indirect benefits traceable solely to the transport investment can be isolated and estimated.

- *Relatively Regressive*: The project benefits high-income groups disproportionately more than low-income groups, and as a result, income distribution is regarded as (relatively) worse with the project, although all groups gain and *absolute* poverty for the lowest income groups is *reduced*.
- *Relatively Progressive*: The project benefits low-income groups disproportionately more than high-income groups, and as a result, income distribution is regarded as (relatively) improved with the project.

The Win-Loss Scenarios (but wins exceed losses):

- *Rawlsian Progressive*:²³ The project benefits the lowest income group most. If it makes other income groups worse off, it is a win-loss scenario; otherwise it is a win-win.
- *Absolute Progressive*: The project benefits the poor but makes the rich worse off. This may involve efficiency-equity trade-offs and may not be feasible in terms of political realities.
- *Absolute Regressive*: The project benefits the rich but makes the poor worse off. It is a dominantly regressive case. Whether or not the project should go ahead will involve consideration of efficiency-equity trade-offs. Very often, re-engineering or compensation (for example, in the form of environment impact mitigation and resettlement) or both are required to ensure that the project does no harm to the poor, or that the poor receive proper compensation for their loss.

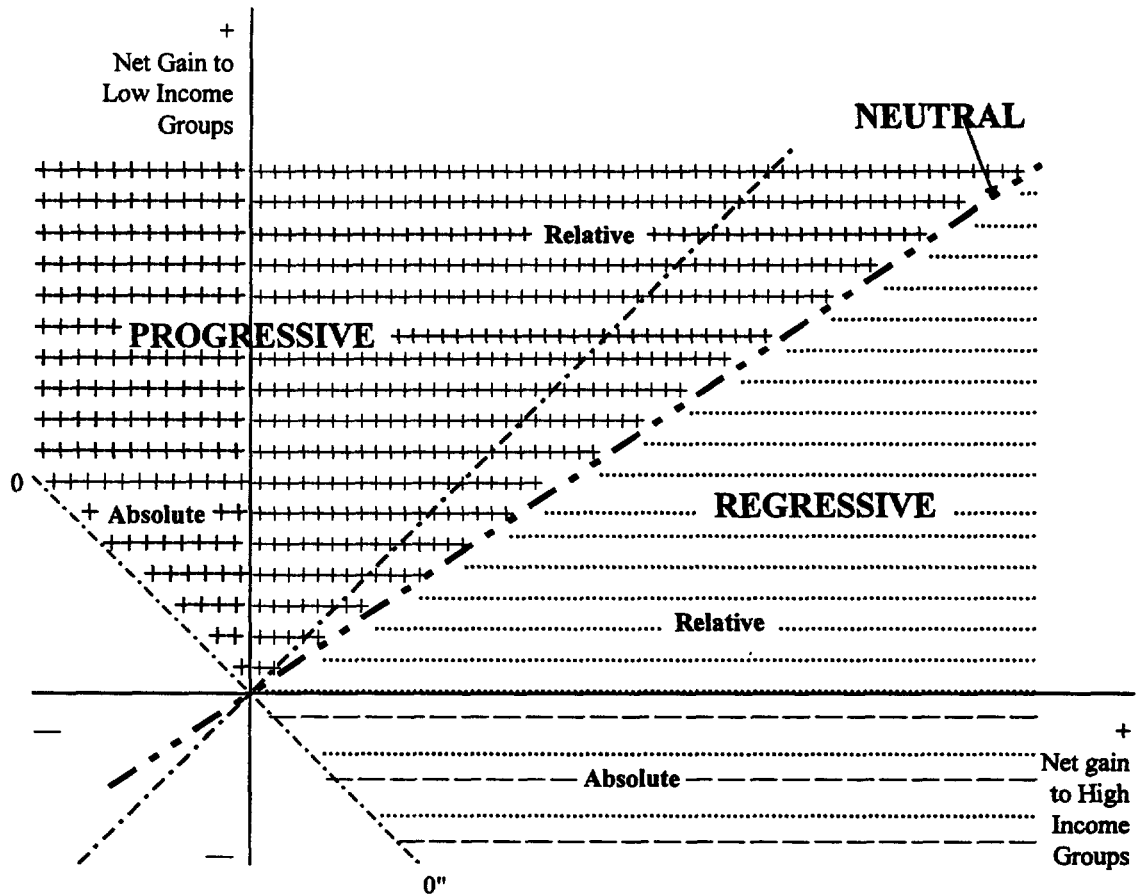
3.4 These various scenarios are depicted graphically in Figure 3.1, which shows the distribution of outcomes in terms of the net gain to low-income groups (along the vertical axis) and the net gain to high-income groups along the horizontal axis. Outcomes shown in Figure 3.1 are limited to those with a positive overall net gain (that is, above the line 0-0" through the origin). This graphical device may be helpful in representing outcomes from alternative project designs or even different sectors, which is discussed later.

3.5 If the initial welfare (or income) levels by income groups without the project and the project benefit (or income additions) distribution among these groups can be estimated,²⁴

²³ John Rawls (1971), *A Theory of Justice*, Harvard University Press. Rawls advanced the extreme position that welfare improvement should be based upon the maximin principle, i.e., only if the poorest person's economic position is raised is there a gain in social welfare.

²⁴ It is reasonably straightforward to estimate the project benefits to the users in monetary terms if the project has negligible network effects and entails little change in modal split. In a more complex urban context, a disaggregate travel demand logit model that includes income and money cost of travel as two of the explanatory variables can be used to predict project benefit distribution among income groups. See Kenneth Small (1983), "Bus Priority and Congestion Pricing on Urban Expressways," in Theodore Keeler (ed.), *Research in Transportation Economics*, Vol. 1, JAI Press, Inc.

Figure 3.1. Distributive Outcome Scenarios



some simple indices, such as Gini-coefficient, can be used to gauge the equity impact of the project. For scenarios where the poor are relatively or absolutely made worse off by the project, there is also the question of whether the losses to the poor are initial or final, and how they are compared with those associated with the relevant counterfactual.

The Potential Conflict between Efficiency and Poverty Alleviation

3.6 Suppose the distributive impacts of projects can be predicted, then a question arises: What choices should be made when the equity objective²⁵ conflicts with the efficiency objective, such as in the regressive cases? In other words, what trade-off between equity and

²⁵ The term "equity" is used somewhat loosely here to refer to the degree of progressive distributional impact in general, and improvement in the welfare of the lowest income group (i.e., poverty alleviation) in particular.

efficiency should be made? This is a question often encountered in the formulation of national transport policies and investment programs and the selection and design of transport projects.

3.7 In general, a working premise is that transport projects for development should be economically sustainable. A basic criterion for this is that a project's net economic benefit expressed in net present value (NPV) at the social discount rate is positive—or the economic internal rate of return (EIRR) exceeds the social opportunity cost of capital.²⁶ Emphasizing the NPV or EIRR, however, often leads to the selection of projects serving higher-income groups over those projects that would serve poorer groups. This tends to arise primarily because project net benefits based on the estimates of willingness to pay (or consumers' surplus) are higher in richer areas than in poorer areas. However, if a country's goals explicitly include the alleviation of absolute poverty and improvement in income distribution, concern with distribution may enter as part of project evaluation,²⁷ in addition to its attention through broader fiscal transfer or tax mechanisms (which may not be well developed). A trade-off between project efficiency and equity will typically have to be made.

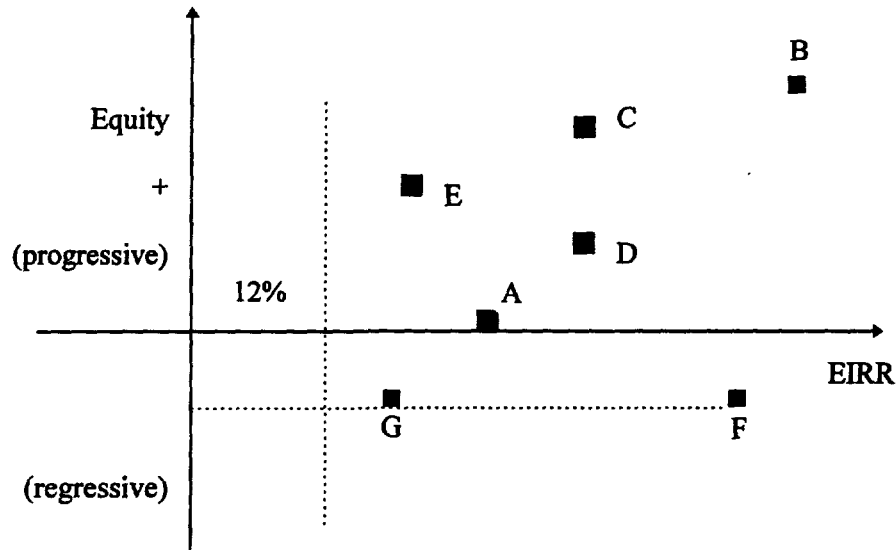
3.8 Suppose a reliable measure of a project's impact on equity is available. The trade-off between equity and efficiency can be illustrated in Figure 3.2. The vertical axis is a measure of equity improvement and the horizontal axis denotes the levels of EIRR (or alternatively, net present value). Each point represents a different project (or an alternative design of the same project). A project with neutral distributive impact would have an equity measure at zero (for example, Project A). When a project's distributive impact is progressive (regressive), its equity measure is positive (negative). Thus, projects B, C, D and E are progressive while projects F and G are regressive. Note that this diagram does not indicate whether the projects are progressive (regressive) in absolute or relative terms.

3.9 Assume all projects have a real EIRR higher than a benchmark, say 12 percent. If all projects are available and mutually exclusive alternatives, project B is clearly most preferred—it has both a higher EIRR and equity outcome than any other project. Project G is least preferred; it is dominated by all other projects. Among projects C, D and E, project C is dominant, but the relative preference of D and E is ambiguous since a trade-off has to be made. Similarly, the relative preference of C and F is also ambiguous. Although project F will shift the income distribution against low-income groups, it has the highest EIRR of any other projects (except project B). In such a situation, a final decision on project selection may require further identification of whether the projects are relatively regressive or absolutely regressive. This would call for an examination of the impacts of these projects on

²⁶ The NPV and EIRR measures of a project's contribution to economic welfare are not equivalent, although the difference is not a major concern here. However, in measuring impact by income group, net present value is required.

²⁷ For a rigorous discussion of equity-efficiency trade-off in project cost-benefit analysis, see R. Layard and A.A. Walters (1978), *Microeconomic Theory*, McGraw-Hill Inc., pp. 42-50.

Figure 3.2. Efficiency—Equity Trade-offs in Project Selection



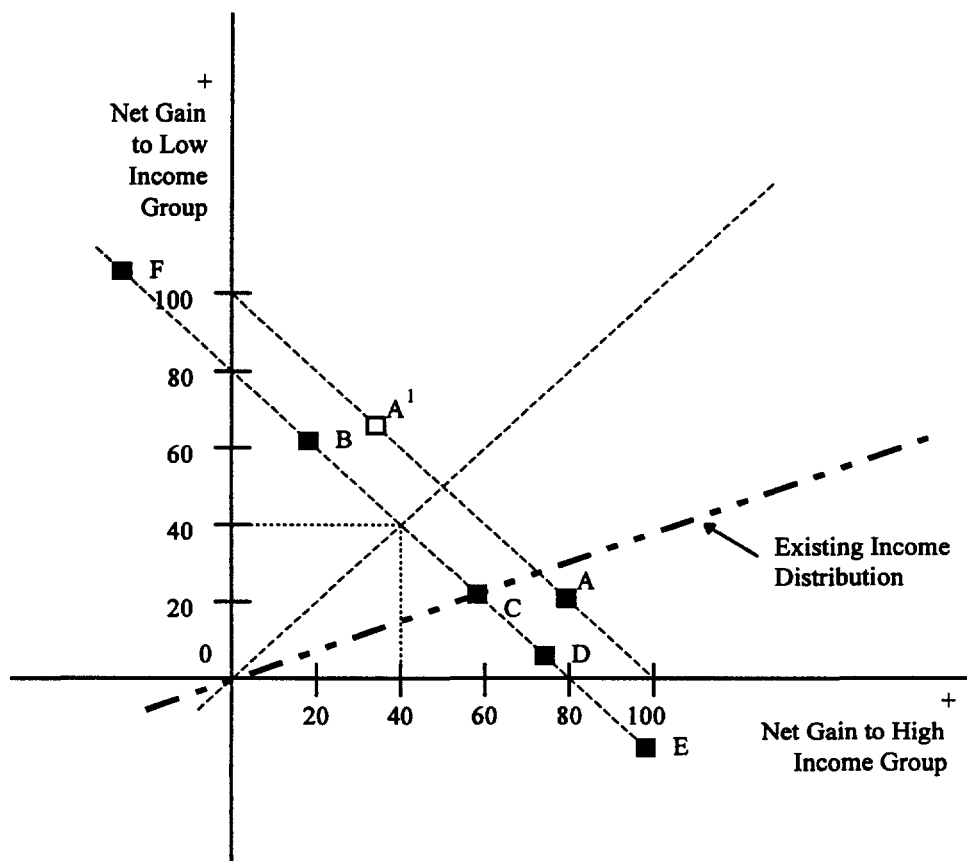
the absolute poverty of the lowest income groups. Depending on the social trade-off deemed politically appropriate, project F may still be selected even if its equity impact is expected to be negative. Its impact on absolute poverty may be positive. If project F was identified as absolute regressive, then re-engineering or compensation would warrant serious attention.

3.10 Figure 3.3 illustrates efficiency-equity trade-offs from a somewhat different perspective. The axes are a stylized representation of the distributive impact of projects in terms of just two income groups—high and low. The existing distribution (relative share) of (money) income for these groups is shown by the ray from the origin through point C. The downward sloping parallel lines between the two axes represent projects with the same present value of net benefits, but different positions along a line correspond to different distributions of the gains from the project. For example, projects B, C, D, E, and F have the same total net present value (80 units); B, C, and D are “Win-Win” outcomes: C is neutral, D is relatively regressive, and B is relatively progressive; E and F are “Win-Loss” outcomes: E is absolutely regressive, while F is absolutely progressive (and also Rawlsian progressive—as is project B). Project A has a higher net present value (100 units) than project B, but is relatively regressive; a choice between projects A and B reiterates the trade-offs between efficiency and equity that can arise. This figure also illustrates the traditional welfare economics theoretical argument that if lump-sum income transfers between income groups were costless, then conflicts between efficiency and equity could be overcome. Thus, for example, the project with the highest net present value (A) should always be selected and its income results changed to achieve the outcome of an equivalent project such as A¹, with a superior (relatively progressive) distribution impact.

3.11 Where possible and appropriate, project evaluation should include identification of the distribution consequences of various project alternatives, in addition to estimates of the

total income or net benefit of each alternative. Decisions regarding different income or income distribution alternatives is a political responsibility. But, there are various ways in which such decisions may be better informed. Some of these ways, including the use of distributional weights, are discussed in Section 4.

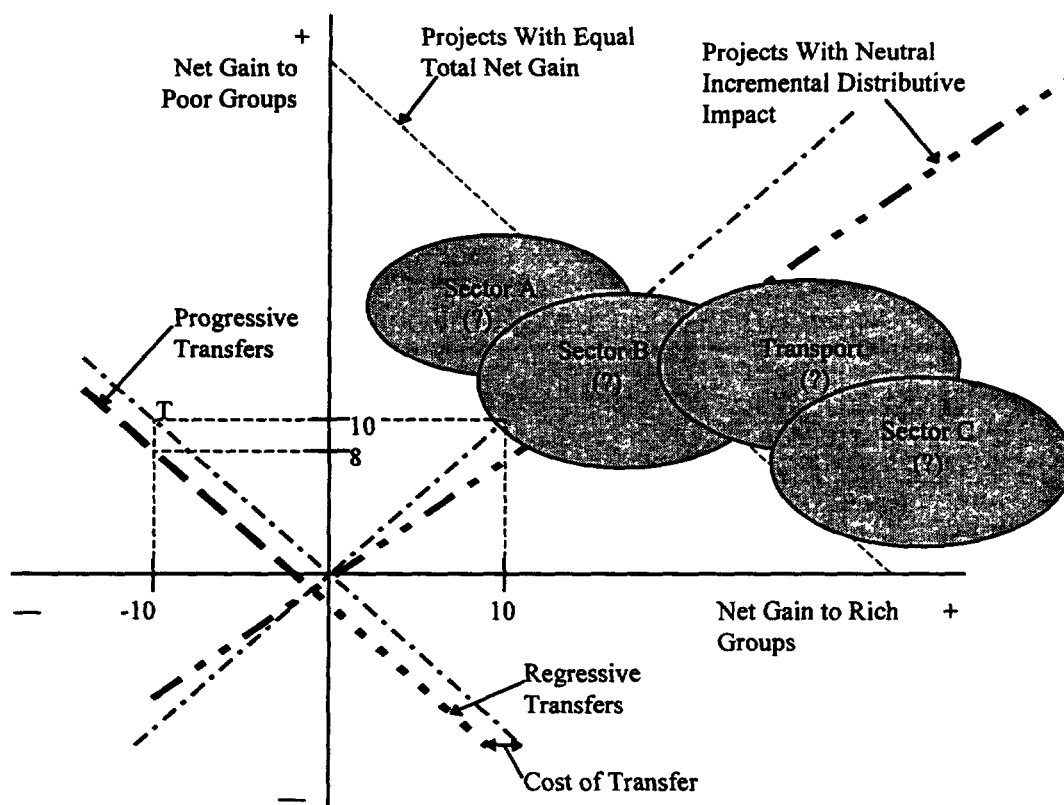
Figure 3.3. Distribution for Project Net Benefits



3.12 Within any sector such as transport, there will be considerable variation in the NPV (or EIRR) and distribution impact of projects. The range of these project outcomes will also differ across sectors. Since there is limited scope for income transfers (via the tax system) in developing countries, the central tendency and variation of EIRR and distributional impact of projects by sector is of direct practical significance to poverty reduction. Unfortunately, very little empirical evidence has been assembled on this question.

3.13 The value of such information is indicated by Figure 3.4, which is an extension of Figure 3.3. Figure 3.4 depicts a hypothetical pattern of the incremental distribution

Figure 3.4. Efficiency and Distributional Impact of Project Options across Sectors (Hypothetical)



consequences of projects in several sectors. The figure suggests that for some sectors (for example, A and B), project outcomes are typically more progressive and involve lower net gains (when normalized on a per capita basis) than others (for example, transport and sector C).²⁸ Note that pure income transfers, as shown in Figure 3.3, involve a cost of transfer—made up of a collection cost (excess burden) from various income taxes, sales taxes, and duties, and a distribution cost (involving administration costs and ineffective targeting). In countries with rudimentary and costly tax systems, the total cost of transfers may exceed the opportunity cost of selecting a relatively progressive sectoral project as the vehicle for contributing to a redistribution objective, rather than the most efficient alternative project available. Thus, projects that have a desirable distributional outcome save costs that may have been incurred in using direct transfers for income redistribution, while projects that

²⁸ The World Bank lending operations experience may offer some indications of the variation of EIRR and distributional impacts by sector, because some sectors (such as agriculture, water supply, and sanitation) are focused relatively more on poverty than the others (such as transport or oil and gas). The following are the averages of *ex post* EIRR weighted by the loan size for selected sectors: 16 percent for 850 agriculture projects, 9 percent for 102 water supply and sanitation projects, 23 percent for 526 transport projects, and 31 percent for 46 oil and gas projects.

have undesirable distributional outcomes may lead to transfer costs to remedy their adverse redistribution of income. To illustrate, referring back to Figure 3.3, if the only project alternatives are A¹ and B, and redistribution (of at least 60 units) to low-income groups is sought, then project alternative B is superior to direct income transfer if the cost of direct transfer is greater than 20, which is the opportunity cost of choosing project B instead of project A¹.

Efficiency and Direct Intervention in Transport Sector Operations

3.14 Transport investments, either focused on the transport needs of the poor or on economic efficiency and growth, can contribute to the reduction of absolute poverty. A policy question is how to make a choice between the relative emphasis given to the two approaches to investment. This is a question often encountered in Bank transport sector operations, particularly when the success of transport development projects is measured by their contribution to poverty reduction as well as to overall income growth.

3.15 Economic efficiency is the central focus in transport sector operations. This emphasis is very important for most transport infrastructure projects because they tend to involve large capital investment. Economic efficiency is also a primary objective for transport sector adjustment projects. However, this emphasis should not be an exclusive one; it should not be used at the project level as a reason to set aside attention to poverty issues. Over-emphasis on economic efficiency often leads to a higher priority being given to strategic projects over access projects. It is the latter that tend to focus on gains in welfare or income for the poor.

3.16 While it is generally acceptable that economic growth that results from efficiency-oriented transport investment brings benefit to the poor, in many cases the basic transport needs of the poor may be more effectively addressed through direct targeting. Valuable opportunities for direct targeting exist in most countries and these warrant systematic assessment. It follows that a balanced attention should be given to the transport needs of the poor, and direct interventions, if justified on social or economical grounds, should be part of overall government policies to assist the poor.

3.17 While targeted interventions can help the poor, it should also be recognized that well-intentioned efforts to directly help the poor may sometimes interfere with the efficient functioning of markets and may even be counter-productive. In particular, there is a danger of actions being subverted by rent-seeking behavior of non-poor parties or by undermining incentives of the poor. Moreover, inadequacy in transport infrastructure and services is one of many problems facing the poor. Transport improvement should be integrated with other sectoral interventions so as to achieve poverty reduction in a cost effective manner.

3.18 Many countries seek to establish a balance between economic growth and social justice. Accordingly, it is important that decisions be made on the basis of sound information regarding their consequences: in particular, the likely reductions in the number of households in absolute poverty and the associated opportunities cost as measured by potential gains in national income foregone. At present, there is no sufficient information to

guide governments in developing countries on how to balance the opportunities for economic growth (over time) with a reduction in the (immediate) human costs of poverty. The best approach appears to be to regard transport projects as contributing to social welfare at two levels. The first level involves widely shared benefits of lower generalized transport costs through improving overall *mobility*. At this level, projects are based on efficiency considerations and contribute to economic growth. The second level is through improving *basic access* to specific prime needs of specifically targeted groups. At this level, projects are based on providing a minimum or threshold level of access (such as travel time/cost) to basic services in a *cost-effective* manner. For example, some developing countries have set a 2-hour walk for 95 percent of the population to feeder roads and other transport facilities as the accessibility threshold. The challenge is to develop guidelines for such basic access that are appropriate to a country's circumstances.

Summary

3.19 Transport projects typically affect different income groups differently. Projects that are intended to promote general mobility may result in very different outcomes in terms of which groups receive (and retain) the net benefits. Understanding the distributive impacts of a project is important if the project's success is measured by its contribution to poverty reduction. Since project design may influence the distribution of benefits, as well as the overall efficiency gains possible in general mobility, trade-offs between efficiency and equity will exist. Such trade-offs—at the sector and project level—may be set aside, on the basis that they should be undertaken in the most consistent manner at the macro-economic level (for example, through the national tax system). This is rarely achieved in practice, however, and the distributive impact of transport projects warrants attention. At the project level, trade-offs may be required for a full evaluation. Choices should be based, however, on socio-political value judgments of what is in a community's or society's best interest. Generally, this calls for presentation of key information on these trade-offs to policymakers in a form that facilitates decision-making.

4. DISTRIBUTIVE IMPACTS OF TRANSPORT PROJECTS ON THE POOR

4.1 In general, transport projects contribute to poverty reduction through their impact on economic growth and/or their impact on personal welfare of the poor. It should be noted, however, that some problems inherent in the transport sector may lead to adverse distributive impacts. A consideration of experiences in the transport sector worldwide suggests three propositions regarding these distributive impacts. First, emphasis of the efficiency criterion in transport project selection and design is likely to involve a "bias" against the poor. Second, transport market and institutional failures tend to impose relatively greater harm on the poor. Third, government regulations in the transport sector, no matter how well intentioned, are often regressive, especially where they place severe limitations on the entry, provision, and use of transport services relevant to the poor. These propositions are examined in some detail below; however, it must be acknowledged that corroborating evidence is limited.

Is the Efficiency Criterion Regressive?

4.2 Economic efficiency is widely accepted as the primary objective of transport sector operations and is used, through cost-benefit analysis, to guide project selection and design. However, criteria to guide rational choice become complicated when poverty reduction is a major concern, because the efficiency objective may be in conflict with *direct* reduction of poverty. A "bias" against the poor may result from the equal weighting given to all income groups in efficiency measures, and their basis in "willingness-to-pay." This problem arises from the role of income (and wealth) in individual consumer demand (and the supply of inputs by resource owners) for transport services and their quality.

4.3 Income is a key determinant of individual travel behavior, shaped by choice of mode and available affordable dwelling location. In general, transport demand is relatively income elastic. Empirical evidence indicates that income elasticities of total travel expenditure are typically larger than unity, implying that the share of the budget spent on travel rises from poorer to richer households. Moreover, long-run elasticities of total travel expenditure are invariably above the short-run elasticities, in part because of the ability to exercise wider choices (including mode of transport, vehicle ownership, and relocation) in the long run.²⁹ On the other hand, however, the very poor often are not able to afford the cost of using "for-payment" transport services. Their main transport mode is walking. They spend a great deal of time and a substantial amount of personal energy on travel, but cover comparatively short distances.

²⁹ Angus Deaton (1987), *The Demand for Personal Travel in Developing Countries*, World Bank. This study estimated various income elasticities of individual travel demands using household expenditure survey and travel survey data from Hong Kong, Thailand, Sri Lanka, India and Tunisia. Also see Yacov Zahavi (1976), *Travel Characteristics in Cities of Developing and Developed Countries*, World Bank Staff Working Paper No. 230.

Basis in Contrast to Bias Inherent in Cost-Benefit Analysis of Projects

4.4 Conventional cost-benefit analysis does not attach specific importance or weights to the social groups that receive a project's benefits or incur its costs. An underlying premise of the efficiency criterion of maximum surplus is that a surplus *could* (that is, has the potential to) be used to compensate all those who lose and still leave the maximum net social gain. In addition, the measures of benefits and costs reflect the prevailing distribution of income (and wealth). Other distributions of income would lead to different valuations of benefits and costs and hence different project choices. It may be argued that this implies reinforcement of the existing distribution of income—and thereby imposes a “bias” against the poor.

4.5 A rigorous cost-benefit analysis requires estimating demand for use of a service by groups of individual users at different price (or *generalized user cost*) levels. Where possible, revealed preferences are used. Under this procedure, observations of the choice of different price-quantity combinations by the poor reflects highly constrained ability to pay, which translates to a very low willingness to pay.³⁰ Benefits and costs are measured by the aggregation of each individual's willingness to pay, equally weighted (a dollar is a dollar is a dollar to whom so ever it may accrue). Projects are then selected on the basis of the total willingness to pay less opportunity costs, i.e., the sum of consumers' and producers' surplus. In general (though not always), this favors projects that serve higher-income groups. In an ideal world, the larger total (national) income that results from this could be redistributed at zero or low cost via the tax system. In practice, this is rarely approached and the distributive consequences of the outcome of the cost-benefit analysis may be regarded as less than socially desirable. The issue becomes one of implementing a compensation mechanism or applying a different basis for project choice. For the latter implicit, if not explicit, higher relative weighting of the net benefits to the poor or low-income groups would be required. In short, measures of costs and benefits are dependent on the prevailing income distribution and the contribution of projects at the margin to that distribution; both aspects pose grounds for concern and for possible remedial attention to the poor.

4.6 This problem is typical in transport project evaluation where project net benefits to the users are measured by the total transport cost savings, defined as the transport costs “without project” less the transport costs “with project.” Transport costs to the users consist of two major components: out-of-pocket costs and time costs. A trip by a motor vehicle, for example, involves vehicle operating cost and time costs to the driver and passengers. Time cost is usually valued as a proportion of the tripmaker's hourly wage. Thus, if a project saves every user the same amount of travel time, then valued on this (equally weighted) basis, the time cost savings for high-income users will be greater than those for low-income users.

³⁰ The analysis covers all affected parties—users and non-users in terms of the full social consequences including any externalities.

4.7 Thus, the project selection will be oriented away from projects serving the poorer areas, and alternatives (or project components) that serve more lower-income individuals than higher-income individuals. As a result, some projects or components for low-income groups *which satisfy the criterion of economic efficiency* may be eclipsed. This orientation will be reinforced by both public agency capital budget constraints and private firm profitability; projects serving higher-income groups will be ranked higher.

4.8 As an example, consider an urban transport project that supports motorization. The construction of motorized transport infrastructure competes with traditional non-motorized transport and pedestrian facilities for scarce land. With very limited space for transport development, the orientation to the higher productivity of land in motorized facility use displaces land allocated to non-motorized transport facilities. This problem is particularly severe in rapidly growing cities in East Asia. Worse yet, the dynamics of growing use of motorized vehicles eventually changes land use and transport combinations. This is unfavorable to low-income groups who rely mostly on non-motorized vehicles and walking for their trips. Transitions from walking to non-motorized transport to public motorized transport and then to individualized motorized transport do not take place along a continuum; a change from one mode to another for any individual often represents a quantitative jump in terms of travel expenditure. This jump may be a major barrier for the poor to overcome.

4.9 Moreover, because of this orientation, transport rights-of-way often displace poor communities. As land prices are typically less expensive in poor communities, the alignments of large-scale road projects are often selected to cross these communities. Some projects are accompanied by the redevelopment of poor communities. However, it is less clear whether the benefits of these projects and the redevelopment ultimately benefit the poor. Most poor households rent housing units. Neighborhood quality improvement due to redevelopment may translate to higher rents that displace the poor households and benefit the property owners.

The Use of Explicit Distributional Weights

4.10 It is possible to incorporate equity considerations, with particular attention to very low-income groups, into economic evaluation in a formal and explicit manner to assist choices among various alternative projects or policies. Two separate steps are involved. The first task is to estimate the impact of each alternative on each selected group, measured by the gains and losses in money units. The second step is to combine these gains and losses into a single measure, which may be deemed to be a change in social welfare. This is normally implemented by adopting a set of distributional weights.³¹ For example, money

³¹ For more discussions of distributional weights in cost-benefit analysis, see Lyn Squire and Herman G. van der Tak (1975), *Economic Analysis of Projects*, The Johns Hopkins University Press, R. Sudgen and A. Williams (1978), *The Principles of Practical Cost-Benefit Analysis*, Chapter 14, Oxford University Press; and Anandarup Ray (1984), *Cost-Benefit Analysis: Issues and Methodologies*, The Johns Hopkins University Press.

measures of benefits and costs associated with low-income groups might be given double the weight used for high-income groups.

4.11 However, the use of distributional weights is highly controversial. Many economists object to it on the grounds that distributional effects should be handled directly through the tax system. It is also argued that distributional weights are subjective, vulnerable to misinterpretation, and open to manipulation. Much of the debate turns on the justification of a particular set of weights based, for example, on inferences from past government decisions on projects, on the structure of the tax system, or on simple postulation (for example, money gains to the poor assigned a weight of double the money gains to the wealthier groups). The debate also involves the role of professional advice in government decision-making processes, and specifically the stance that decisions regarding redistribution are the exclusive domain of politics (recognizing that advice may be provided on the expected outcomes for particular groups).

4.12 Because transfer costs and inconsistencies in political processes render inferences from past government decisions unreliable, the use of explicit distributional weights is, by and large, not appropriate in project appraisal. *Attention should be concentrated on tracking the distributional outcomes of project alternatives, together with developing efficient projects that benefit low-income groups, and formulating relevant displays of this information.* Such displays should include a balance sheet or matrix showing the gains and losses by selected social or income groups, and the efficiency-distribution trade-offs among alternatives as well as, where illuminating, an estimate of the distributional weights for which each project alternative becomes equivalent to the most efficient alternative (which might be called *switching weight* values).³²

A Voice for the Poor

4.13 The problem of the orientation inherent in cost-benefit analysis can be made still worse by other factors. The most notable is that the voice of the poor in the political process is often relatively weak. The poor are not given significant expression because poverty is often associated not only with geographical isolation, but also cultural and political isolation. Most of the poor live on the margin of society. They are usually not politically empowered. When the poor have relatively little political influence, their affordable transport modes (notably non-motorized transport) are typically overlooked, or possibly dismissed. Because of this, decisions on transport investment and transport policy may not take adequate account

³² The wealth of information revealed through the market system (where necessary with adjustment to shadow prices) emerges via numerous transfer effects (pecuniary economies) which, of course, take place on the basis of equal money exchanges—regardless of the social status of the party to the transaction. An attempt to introduce distributional weights would modify all these previous transfer effects and require that their effects be modeled or simulated to identify the final outcome based on distributive weights. In most circumstances, such an exercise is impractical. A focus on the final incidence of benefits and costs, as registered through the market system, is itself a complex task.

of costs and consequences imposed on the poor. Put simply (yet hardly profoundly), there is also often a political bias against the poor.

Methodological Problems in Cost-benefit Analysis of Transport Projects

4.14 Another issue is lack of reliable methodologies to evaluate the incidence of project benefits and costs, and particularly the extent to which, and the conditions under which, they actually accrue to the poor. The problem is particularly serious in rural road projects that serve poor areas with very low levels of existing (pre-project) traffic. The conventional approach to estimate the benefits of investment in transport development measures the change in (consumer) surplus, given a demand schedule for the transport services. Thus, when transport cost is lowered by new investment, and the price to the user falls, the quantity of transport demanded will increase and both existing and new users receive a gain. It is argued that while this approach is applicable in developed economies where resources are fully employed, it is not applicable in developing economies where resources are under- or unemployed. In developing economies, road development can bring about substantial structural change. If this happens, the whole demand schedule for transport will shift, typically to reflect an increase in transport demand.³³

4.15 There are also limited methodologies to evaluate the extent to which project benefits actually accrue to the poor who rely heavily on non-motorized transport (NMT) and walking for trip-making. As a result, the benefits to the NMT users and pedestrians are either neglected or incorporated using *ad hoc* methods. Some innovative efforts have been made in recent years in developing methods for the evaluation of NMT. The success of the methods depends on an in-depth understanding of the transport market for NMT services. For example, in rural Bangladesh, passenger rickshas and ricksha vans operate in a highly *competitive* market, with fare charges reflecting the actual time and energy inputs of the pullers, and other costs on different types of roads. In the economic evaluation of a World Bank-financed Bangladesh rural feeder road project, the estimated vehicle operating cost savings for these non-motorized vehicles are based on actual competitive market fare differentials observed between different road conditions.³⁴

³³ Raisuddin Ahmed and Mahabub Hossain (1990), *Developmental Impact of Rural Infrastructure in Bangladesh*. Research Report 83, International Food Policy Research Institute, in collaboration with the Bangladesh Institute of Development Studies.

³⁴ World Bank (1996), *Bangladesh: Second Rural Roads and Market Improvement and Maintenance Project*, Project Implementation Document No. 15: Economic Appraisal of FRB Roads. (Internal document with restricted circulation).

Commercialization, Privatization, and Restructuring

4.16 In recent years, many developing countries have made major efforts to introduce commercialization, privatization, restructuring, and the removal of barriers to market entry and competition. These efficiency-oriented actions may eventually enable governments to address more effectively the relationship between poverty and the transport policy environment. In the short run, however, these adjustments may overshadow intentions to meet the transport needs of the poor. For example, transport sector adjustments may result in disadvantageous rapid price and income effects on the poor. The introduction of commercial discipline into the transport sector is necessary for improving the technical and allocative efficiency, but the resulting increases in taxes and cost recovery may make the poor less able to afford the services they used.³⁵ Under these circumstances, an important role of the government is to consider provision of direct or targeted assistance to the poor. A safety net (such as travel vouchers), for example, is an option to consider.

Market Failures and Institutional Failures

4.17 Two principal types of market failure in the transport sector are the exercise of monopoly power and the pressure of externalities (notably motor vehicle pollution and congestion). Market failures are often addressed by government through institutional interventions. However, such interventions may themselves fail. The interventions may be impotent or introduce additional distortions: the cure might be worse than the malady.

Monopoly Power

4.18 Certain types of transport infrastructure and services are subject to increasing returns to scale, indivisibility and high sunk costs, and as a result the presence of natural monopoly and weak contestability. Although these features of transport market structures have substantially diminished with technological change, and the unbundling of functions in some modes (for example, roads, airports, ports), the problems persist. In the presence of monopoly power, lower levels of service tend to be provided at higher levels of price, and often all users are made worse-off; but the poor are likely to be hurt the most. If the poor are not able to afford the higher prices, they may lose services entirely that gave access to economic opportunities that were otherwise unavailable to them. Under such circumstances, consideration should be given to supporting services to low-income areas (for example, travel vouchers). However, in many cases, the poor are not directly affected since they are not major users of formal motorized transport services.

4.19 Other forms of market failure also tend to be relatively regressive. High transport costs limit access to suppliers of products and services, inhibit information flows, increase uncertainty and reinforce credit market failures. Many transport services are complementary (for example, feeder/main services and interconnecting modes), and under different

³⁵ World Bank (1996), *Sustainable Transport: Priorities for Policy Reform*, p. 72.

ownership or management, coordination problems arise (for example, meshing schedules, hours of operation, and common terminal facilities). Both of these forms of market failure tend to discourage private investment and result in higher prices. As a user group, the poor are likely to be the most disadvantaged. There is a potential role for the public sector in ameliorating these forms of market failure, for example, by facilitating coordination for operations and adopting a leadership role or brokerage for terminals (to reduce risks associated with the high sunk costs).

Externalities

4.20 Transport externalities (such as vehicle emissions, congestion, and the risk of traffic accidents) are other causes of market failure. The impact of these types of market failure on various income groups in general, and the poor in particular, is unclear and is not well documented. If the rich and the poor face the similar degree of health and accident risk, the poor are victims to a greater degree than the rich because motor vehicle users are mostly among the rich. In fact, there are many situations where the poor face higher risks than the rich. The poor tend to live closer to traffic on arterial roads and therefore are exposed to traffic pollution more intensively and frequently. In many large cities, the poor tend to suffer more from mixed traffic on the streets. Because they tend to use more vulnerable modes including walking, they are more likely to be the victims of traffic accidents. Accident risk in mixed traffic corridors is higher for non-motorized transport users than motorized transport users.³⁶

Government Regulations

4.21 To promote market efficiency, some degree of government oversight or regulation is usually warranted. However, some government regulations are prone to distortion, capture, and excessive administration. Moreover, these regulatory failures are likely to hurt the poor more than the rich, although again, there has been little documentation. To illustrate this proposition, a few examples relating to emission regulation, public transit regulation, and land use control are discussed below.

Emission Regulations

4.22 Motor vehicle ownership is very low in most low-income countries. Direct use of motor vehicles by low-income groups is low. In some developing countries, however, ownership and use of motor vehicles (particularly motorcycles) is increasing rapidly. Although the poor are extremely unlikely to own a motor vehicle, some of them are likely to be users. Also, some low-income individuals acquire a motor vehicle to provide transport services for a living; other low-income individuals are hired as drivers. Therefore, it is

³⁶ Cheaper modes of transport may be cheaper in part because they involve more risks and quality of service (including safety) is both costly to provide and income-elastic.

important to understand the distributive impact of emission regulations. This is useful for making a choice between alternative pollution control instruments.

4.23 Emission regulations increase the cost of owning and using motor vehicles. If only the high income households own and use motor vehicles, emission regulations can have a progressive impact across households. However, the situation may change when both the rich and the poor are involved. Generally speaking, a regulation that sets an emission standard for all motor vehicles may hurt the poor more than the rich, because the cost to maintain the emission standard has a greater adverse income effect on the poor than on the rich. A regulation that requires emission control devices for all vehicles, whether new or old, is more likely to affect the income of the poor than is a policy of controlling emissions for new cars, because the poor are more likely to own and use old cars than the rich. Additional private costs imposed by emission regulations will raise taxes and reduce for-hire motor vehicle output: some (low-income) owner-drivers and employed drivers may lose work. Improved air quality will benefit all, but for some individuals real incomes may fall due to loss of money income.

4.24 It should be noted as well that government regulations that impose increases in the costs of owning and operating vehicles may affect the rural poor more than the urban poor for two reasons. First, rural areas are where the external costs of vehicle use, such as pollution, are less. Second, empirical evidence suggests that, holding income constant, rural households, or households in the less developed areas outside towns, are more likely to own vehicles for travel than urban households.³⁷ This may reflect the fact that there are more forms of transport available in urban areas than in rural areas. Increases in costs or taxes falling on the operation or ownership of vehicles will therefore raise the cost of travel relative to income more for rural owners than for those in cities. Moreover, because of poorer infrastructure in rural areas (rather than a systematic difference in vehicle ages), rural owners of vehicles spend more on repairs and maintenance relative to fuel than urban owners.³⁸ Government regulations that lead to increases in the cost of materials or vehicles will similarly have a greater impact on rural households.

Public Transit Regulations

4.25 Public transit regulations, especially those creating barriers to entry and imposing service standards, may affect the welfare of the poor adversely, partly because quality of service is income-elastic. In many situations, regulations aimed at helping the poor turn out to be counter-productive and reduce the welfare of the poor. In general, such regulations are regressive.

³⁷ Angus Deaton (1987), *op. cit.*

³⁸ Angus Deaton (1987), *op. cit.*

4.26 In many developing countries, governments attempt ostensibly to protect low-income public transport users by regulatory control of public transport fares. However, this in turn often motivates transit providers to lower their quality standards in an effort to keep costs within the bounds established by regulation. Lower schedule frequency, antiquated equipment, and abandonment of less-patronized lines are all methods of affecting service and cost reductions. If these services are used mostly by the poor, it is unclear whether the gains of the poor from lower fares can offset their losses in service quality. In some cases, the poor are actually the losers.³⁹ From a dynamic perspective, the deterioration of transit services associated with fare regulation may improve the competitive attraction of alternative transport by private auto, which in turn further deteriorates regular public transit service quality.

4.27 The informal sector is often heavily involved in public transport service provisions in many developing countries. This sector employs many low-income workers. Government regulations that restrict the provision of transport services by the informal sector will directly hurt the poor by restricting entry and employment and by raising costs and the price of transport services. In this sense, transport market liberalization or deregulation may provide employment opportunities and higher incomes to the poor.

Land Use Control

4.28 In developing cities, many poor households live in residential locations far from workplaces. This restricts their range of employment opportunities. For those who do have a job, they have to commute a long distance, often by modes of poor quality. A long-run solution to this problem is residential relocation to neighborhoods close to job locations. However, the poor may not be able to adjust their residential location because they have limited choice with their low-incomes. Moreover, government regulations such as zoning laws and building codes that control the use of land and the size of housing units make home moving very difficult for the poor. These land use regulations affect high-income households very little, but in effect they eliminate segments of the housing market available to the poor.

Summary

4.29 Transport sector operations do have important direct impacts on the poor. In particular, some problems inherent in the transport project evaluation process and in transport market structures often adversely affect the poor more than the rich. Because these adverse impacts on the poor contribute to both relative poverty and absolute poverty, heightened awareness on these distributive impacts is very important for appreciating the contribution of the transport sector to poverty reduction. This awareness needs to be translated in systematic manner into the formulation of national transport policies and

³⁹ Kenneth M. Gwilliam (1996), "Getting the Prices Wrong: A Tale of Two Islands," *Infrastructure Notes*. Transport No. UT-6, World Bank.

investment programs, and into the selection and design of transport development projects. Unfortunately, there have been very few studies of the distributive impact of transport in general, and transport operations in particular. The consequences for the poor of transport projects, external effects, and government regulations have not been adequately documented.

4.30 Conventional cost-benefit analysis does not take distributive impact into account and hence does not inform government decision-makers of the social groups that stand to gain and lose as a result of their decisions. Nor does it inform decision-makers of the effect of projects on poverty reduction. In addition, since cost-benefit analysis involves adding the gains and losses to all affected groups on the same basis, it may be argued that it involves a selection orientation against low-income groups. To overcome this orientation, one approach is to introduce distributional weights that assign different weights to money gains or losses to different income groups. In general, this approach is *not* appropriate. Distributional judgments should be resolved through political processes. However, these processes can be assisted in a rigorous way by extending the conventional cost-benefit analysis framework to cover distributional outcomes and to display this information in a balance sheet format as *an adjunct* to the conventional cost benefit analysis. Analysis of distributive outcomes can be difficult, however. The practical extent to which it can be undertaken needs to be judged carefully; for example, a strong(er) case prevails in situations where the distributive outcome is likely to *differ* significantly across alternatives, and especially where there is little difference in efficiency among alternatives.

5. DIRECT ASSISTANCE TO THE POOR WITHIN THE TRANSPORT SECTOR

5.1 Transport interventions have an important role as a direct policy tool for poverty reduction. When the poor do not have adequate access to basic social services and markets, the provision of modest, low-cost transport can be of substantial value to them. Direct assistance for the transport needs of the poor underpins other poverty alleviation efforts. This section reviews some of the ways transport can be used to provide direct assistance.

Transport Needs of the Poor

5.2 The poor are a diverse group both among and within countries, and their specific transport needs vary substantially. Rural and urban transport problems are also very different. Because of these diversities, direct interventions require careful design if they are to serve the special needs of the poor. This raises an important operational question: What do we know about the transport needs of the poor?

5.3 Specific data on transport behavior of the poor are very limited because of a lack of detailed household travel surveys. Most transport surveys are conducted in cities. However, these surveys usually do not reflect the full extent of the transport problem of the poor because they are not designed to do so. There are few systematic studies on the transport demands of the poor.⁴⁰

5.4 Nonetheless, some general characteristics of the transport problems experienced by the poor can be observed (Box 5.1). A typical phenomenon in developing countries is that the poorest people use almost no motorized transport. Most of them make trips on foot. Because the poorest groups are not able to afford any for-payment transport services, they have to carry heavy loads (for example, agricultural inputs and outputs, water, and fuel for home needs) on their backs and heads over long distances. They also often face traffic hazards when they have to travel on foot or by non-motorized modes in mixed traffic. In rural areas most poor suffer from inadequate access to markets and to basic social services. In many developing cities, long commuting time by slow and uncomfortable means over long distances is perhaps the most common transport problem for the urban poor. This is partly caused by their inability to change their residential location.

⁴⁰ Two studies are notable: Angus Deaton (1987), *The Demand for Personal Travel in Developing Countries*, World Bank Discussion Paper; and S.D. Ellis (1996), *The Economics of the Provision of Rural Transport Services in Developing Countries*, Ph.D. Thesis, Cranfield University, School of Agriculture, Food and Environment. A good summary of studies on transport needs of the urban poor can be found in Rachel E. Kranton (1991), *Transport and the Mobility Needs of the Urban Poor: An Exploratory Study*, World Bank, Infrastructure and Urban Development Department, Report INU 86.

Box 5.1. Transport Profile of the Poor

In Ghana's Savannah region, a typical rural family lives in a village several miles away from the market town where the family sells their meager cash crops and buys essentials. However, the market town is linked by dirt tracks and an unsealed road that is washed away every time the rains come. Obviously, the road closure under bad weather condition deprives the family of opportunities to earn cash.

In villages just outside the capital city of Accra in 1984, women selling locally grown oranges—each woman with a basket-load on her head—would ask desperately low prices and still find few buyers. Yet, less than 10 miles away in Accra, fresh oranges were expensive and hard to find. The cause of this situation was identified to be the lack of affordable, intermediate means of transport for farmers to ship their produce to the market. A World Bank financed transport project—Ghana: Transport Rehabilitation Project—was partly designed to address this problem described above. The project focused on the provision of intermediate (non-motorized) means of transport.

In many developing cities, the poor typically live in shantytowns located on city peripheries. In Mexico City, for example, many poor living in Chalco, a low-income settlement at the southeastern edge of the metropolitan area, have to commute by bus and metro across the city to the industrial district at the northwestern edge. A typical trip involves multiple transfers and a total of 90 minutes, mostly in the overcrowded buses and metro.

Sources: World Bank (1990), *World Development Report 1990: Poverty*, Oxford University Press, p. 24; World Watch Institute, *World Watch*, Vol. 2, No. 3, May-June, 1989, p. 8.

5.5 Data on household expenditures on transport across household income levels are often used to measure the extent of transport problems for the poor. However, there is no consistent evidence whether or not the poor spend a higher proportion of their income on transport than other groups. One study in Delhi, India found that poor households spent a higher proportion of their income on travel,⁴¹ yet another study using household expenditure data from India, Tunisia, Sri Lanka, and Thailand discovered no significant proportion of households in the lowest income classes devoting inordinately large shares of their total expenditure to transport.⁴² Because trip-making is affected by many non-income factors such as service availability and activity location, empirical evidence should be interpreted according to the specific conditions of the study area. Many of the poorest do not make regular commuting trips because they do not have a regular job. Moreover, it is important to understand other dimensions of transport problems facing the very poor. The very poor typically cannot afford the cost of using "for-payment" transport. Where the poor have little choice of modes other than walking, they have to spend time and personal energy that could be used for activities which would raise their living standards. The amount of money they

⁴¹ D. Maunder, et. al (1979), "Household and Travel Characteristics in Two Residential Areas of Delhi, India," *TRRL Supplementary Report 673*, p. 7.

⁴² Angus Deaton (1987), *op. cit.*

spend on travel may be small, but may be a high proportion of their disposable money income.

Rural Transport

5.6 The scope for using direct transport interventions to assist in reducing poverty is likely to be the greatest in poor rural areas. First, targeting can be reasonably effective because the rural poor are often geographically isolated and they are a relatively more homogenous group than the urban poor. Second, road maintenance work based on labor-intensive techniques may provide the rural poor with income-earning opportunities. Third, scarcity of income-earning opportunities in poor rural areas strengthens the incentive for participation, which is often the key to the success for direct interventions. Accordingly, transport improvement should be considered as a policy tool for direct intervention to alleviate rural poverty.

5.7 Direct interventions should focus on the provision and improvement of rural *basic* accessibility to local facilities and to the primary network through better roads and the use of intermediate means of transport. To achieve the best results, community participation in decision-making should be ensured, and necessary technical advice and training should be provided.⁴³ In addition, locating basic infrastructure facilities and social services in close proximity to the rural poor reduces their travel requirements. In this respect, a large number of small scale facilities (possibly involving higher unit service costs) reduces transport costs to users and possibly for road infrastructure.

5.8 The World Bank has had a long history of rural road investments with an emphasis on poverty reduction. The Bank's rural road projects focus mostly on the construction, rehabilitation, and maintenance of *feeder roads* or *access roads*. Some are stand-alone rural road projects; some constitute part of a more comprehensive government effort to alleviate rural poverty, increase agriculture production, and facilitate the provision of social services. In many cases, labor-intensive methods are used, including the employment of women in road work of construction and/or maintenance.

5.9 A common objective of these projects is sustainability of the transport improvements for the poor. Attempts to achieve this include implementing cost recovery policies and building institutional and financial arrangements to enable indigenous capacity in the private sector. This typically calls for a strengthening of institutional capacity at the local government level and developing small- and medium-size enterprises to manage and execute maintenance and minor upgrading of rural roads.

⁴³ These points were also covered in World Bank (1996), *Sustainable Transport: Priorities for Policy Reform*.

Box 5.2: Bangladesh—Improving Rural Roads and Markets

The Bangladesh Rural Roads and Markets Improvement and Maintenance Project aims to increase agricultural production and incomes by providing all-season accessibility by road and reducing marketing costs in eight districts of northwest Bangladesh through improved rural transport *and* market infrastructure in selected market centers.

These objectives are to be met by improving road maintenance, upgrading rural roads, and investing in market center facilities. Many market centers lack all-season access to the arterial roads. In addition, common facilities such as interior roads, walkways, market yards, sales platforms, and covered sheds are in poor condition; facilities lack clean water, disposal, and drainage; perishable goods are sold under unhygienic conditions and spoilage is excessive. The project would reduce transport costs for agricultural inputs and output, provide easier access to marketing agencies and support services, make possible the production of higher-value, more perishable crops, reduce storage losses, and facilitate access to off-farm jobs. A major feature of the project is a focus on improving construction quality and maintenance through technical assistance and training, and improving the programming and monitoring works.

Source: Adapted from World Bank (1992), *Poverty Reduction Handbook*, Box A7.10, p. A7-11.

5.10 Some Bank projects go beyond the physical improvement of rural transport conditions. For example, a Bangladesh project was designed to improve both rural roads and rural market center facilities in order to maximize the project's *direct* benefits to the rural poor (see Box 5.2). The Morocco Secondary Roads Project (1995) addresses the core needs of the rural poor by improving access to social services and to produce market. It also attempts to accelerate private sector development by reducing regulatory constraints in road transport. Two projects in Ghana, the Ghana Transport Rehabilitation Project (1987) and the Ghana Second Transport Rehabilitation Project (1990), are particularly notable. They were successfully integrated into Ghana's economic recovery program. The rehabilitation of the neglected transport network helped facilitate supply response to macroeconomic policy changes. Through the provision or rehabilitation of low-cost farm-to-market roads, use of labor-intensive road construction methods, and promotion of appropriate, low-cost transport vehicles to complement rural road investments, these projects improved rural transport and contributed to rural poverty reduction.⁴⁴

Gender Issues Associated with Poverty and Transport

5.11 In many low-income countries, particularly in African countries, women are principal producers and marketers of food. Many of them are not able to afford bicycles or carts. They rely on head portage to carry their produce to markets. Reducing the transport

⁴⁴ Thampil Pankaj (1991), "Designing Low-Cost Rural Transport Components to Reach the Poor," *Infrastructure Notes*, Transport No. RD-2, World Bank.

burdens of rural women would release their time and energy for more productive and socially beneficial activities.⁴⁵

5.12 The World Bank experience suggests that the beneficial impacts of transport infrastructure on women can be profound. For example, an *ex post* impact study of a World Bank financed rural road paving project in Morocco revealed that a major impact of the project was on girls' enrollment in primary education, which more than trebled in the project zones a few years after the completion of the project. Road improvement facilitated access to existing schools, made it possible for teachers to commute from towns to village schools, and enabled local authorities to establish new schools and recruit more teachers. As a result, the enrollment rates increased for both boys and girls, but the rate for girls, which had been much lower than that for boys before the project, increased more. The same project also benefited women substantially, as the paved roads sharply increased the affordability of butane for cooking and heating, dramatically reducing women's daily chore of collecting fuel.⁴⁶

5.13 Ensuring the benefits of transport reach women requires foresight and attention to component design during project planning.⁴⁷ For example, the full benefit of road projects that link villages to markets cannot be realized unless potential users, and women in particular, overcome the cost barriers involved in the use or purchase of alternative, intermediate mechanical means of transport such as bicycles and wheelbarrows. The Ghana Transport Rehabilitation Projects I and II (1987 and 1990) supported a pilot component to channel part of the wage earnings from labor-intensive road works to finance hire-purchase programs for intermediate means of transport for the rural poor. These were distributed through user groups, mainly women, who are the main beneficiaries.

5.14 Women can benefit from road work as well. Surveys in Botswana, Kenya, Lesotho, Madagascar, and Tanzania indicate that women are eager to participate in road work opportunities. Measures to make it possible for women to participate include disseminating awareness, extending eligibility conditions, and training women to take supervisory positions.⁴⁸

⁴⁵ Christina M. Calvo (1994), *Case Study on the Role of Women in Rural Transport: Access of Women to Domestic Facilities*, Sub-Saharan Africa Transport Policy Program Working Paper No. 11, World Bank.

⁴⁶ Hernan Levy (1996), *Kingdom of Morocco: Impact Evaluation Report: Socioeconomic Influence of Rural Roads*, World Bank, Operations Evaluation Department.

⁴⁷ World Bank (1994), *World Development Report 1994: Infrastructure for Development*, Oxford University Press, Box 4.6, p. 85.

⁴⁸ World Bank (1994), *op. cit.*, p. 85.

Transport for the Urban Poor

5.15 Direct interventions designed to meet the transport needs of the urban poor often turn out to be more difficult to implement and less effective than those targeted to assist the rural poor. In urban settings, a highly heterogeneous population shares a wide range of public infrastructure and services within a confined space. Direct interventions may interfere with the functioning of the market, and may distort transport modal choices and other market choices. The situation is further complicated by the fact that most poor households rent housing units from richer owners, and that the poorest households have little choice but to resort to squatter settlements. Effective targeting is extremely difficult as the benefits may be vulnerable to capture by wealthier segments of the population. For example, the benefits of investing to improve the street conditions and transport services in poor neighborhoods where the supply of land is constrained, may largely pass through to the absentee owners of housing properties in the form of higher rents, which, in turn, may force the poor renters out of the improved communities. One approach to this problem is to base targeted assistance on self-selection by the poor. Since the quality of transport services is income-elastic, assistance to only basic transport services may be the more effective solution for low-income groups.

5.16 Similar problems may occur for rail and metro system investments. The construction or extension of a metro or rail system in a large developing city is sometimes claimed to help the poor. The argument is that rapidly increasing motorization and road congestion in large developing cities contribute to the deterioration of road-based public bus transport, which is used relatively more by the poor. Construction of a metro line or city-wide system may improve public transport accessibility in general, including for the poor located within the metro service area. However, if metro operation is to be sustained, cost recovery becomes a major concern. Typically, the poor cannot afford the fares, even with subsidies. Moreover, in the long term, land value increases as a result of improvements in accessibility by the metro will tend to force the poor, who used to occupy adjacent rental housing, to relocate to the urban fringe.⁴⁹

5.17 Public transport subsidies are widely used, ostensibly as a direct instrument to assist poor users who are not able to afford even the lowest cost transport services. However, programs designed to open the poor's access to transport services through subsidies have proven generally unsustainable because they are extremely difficult to target. In many cases, subsidies are mostly captured by transit operators in the form of subsidy leakage to inflated transit operating costs, or captured by property owners in the areas served by subsidized services in the form of increased property value (due to improvement in accessibility).

⁴⁹ Slobodan Mitric (1997), *Approaching Metros as Potential Development Projects*, Discussion Paper, Transport Division, Transportation, Water, and Urban Development Department, World Bank.

Box 5.3. Targeting the Transport Problems of the Urban Poor

Alternatives for helping the urban poor in the transport sector include:

- Improve physical access to jobs and amenities and reduce excessive time spent walking
- Reduce barriers to the supply of informal transport services (mini-bus, public motor vehicles), subject to reasonable and enforceable levels of safety
- Reform regulation of urban bus services, especially competitive tendering for route franchises
- Enable greater use of non-motorized transport by improving rights-of-way, interchange infrastructure, and attention to safety and eliminating fiscal and financing impediments to vehicle leasing or ownership
- Eliminate gender biases by integrating the transport needs of women into the mainstream of transport policy and planning

Source: World Bank (1996), Sustainable Transport: Priorities for Policy Reform, The World Bank.

5.18 The difficulty in targeting also arises when a substantial proportion of poorer groups do not purchase transport services. In these situations, public transit subsidies in the form of lower fares are either unlikely to reach these groups, or, if used, are unlikely to raise their welfare significantly.⁵⁰ Clearly, subsidized public transit fares designed to assist existing low-income commuters do not target the poorest, who are mostly jobless.

5.19 Given the limitations surrounding the effectiveness of public transit subsidies, it is important to explore alternatives to helping the urban poor. The World Bank experience suggests some possible options (see Box 5.3). The Bank's urban transport projects that include poverty reduction as an objective recognize three common problems confronted by the urban poor: (a) poor access to jobs and public transit; (b) low level of affordability; and (c) traffic safety that disproportionately affects the poor. Accordingly, the project components designed to contribute to poverty reduction in urban areas include improving access to jobs and public transport in low-income areas to reduce travel time and costs, and the provision of safer pedestrian and non-motorized transport facilities as affordable means of transport.

5.20 An important lesson from the Bank's experience is that a careful analysis of the poverty profile and market structure is necessary in devising channels for the benefits of direct interventions to reach the poor. The success of transport interventions for urban poverty reduction is also highly dependent on the transport policy environment. In many cases, the use of public transit subsidies is due to the fact that some basic modes (for example, pedicabs) are prohibited from entering the public transit market. Reforming public transit regulations to reduce barriers to the supply of informal transport services may be a more effective and sustainable way to help the urban poor.

⁵⁰ Angus Deaton (1987), *op. cit.*

Box 5.4. Ghana—Labor-Based Methods of Road Work

In 1986 Ghana became the first Sub-Saharan African country to launch a program introducing labor-based methods in the local road contracting industry. The program was initiated as a component of the World Bank's fourth highway project in Ghana and was later funded as part of the World Bank's National Feeder Roads Rehabilitation and Maintenance Project.

The program has been successful. Between 1986 and 1994 the program created about 2.6 million person-days of employment, and rehabilitated 1,190 km of gravel roads. In addition—and most importantly—during the pilot phase, labor-based methods were shown to cost approximately US\$12,035/km with an average rate of completion of 1.4 km/month per contractor while equipment-based methods cost approximately US\$19,463/km with an average rate of completion of 2.1 km/month.

Source: Elisabeth A. Stock (1996), "Developing Successful Labor-Based Contractor Programs: Lessons from Ghana," *Infrastructure Note*, No. RD-21, World Bank.

Labor-Based Methods

5.21 A range of production methods, with varying labor-capital combinations, are available for road works covering construction, rehabilitation, paving and maintenance. The relative economic efficiency of these methods depends on the relative prices and productivity of inputs, especially the cost of labor and capital. Although some tasks cannot be done adequately by hand, for many tasks labor-based work methods can be cheaper and more reliable than capital-intensive works. Importantly, the use of labor-based methods can generate income-earning opportunities for the poor. Therefore, these methods for road work are promoted (especially by donors and international labor organizations) as one means of supplementing rural employment in developing countries.

5.22 The localized benefits of labor-based methods extend beyond the savings in the cost of road work and the creation of jobs. Other benefits include savings on foreign exchange, injection of cash into local economy, and transfer of knowledge of road works to local communities. These reinforce the sustainability of road maintenance activity.⁵¹

5.23 The World Bank has supported with success the cost-effectiveness of labor-based methods for road work for many years. For example, labor-based methods implemented under the Ghana Fourth Highway Project (1986) and National Feeder Roads Rehabilitation and Maintenance Project (1991) were estimated to be cheaper than heavy equipment and to generate additional local income (see Box 5.4). The Albania Rural Roads Project (1995) generated an estimated 10,000 man years of work in the region with the highest unemployment.

⁵¹ Elisabeth A. Stock and Jan de Veen (1996), *Expanding Labor-Based Methods in Roads Programs*, Sub-Saharan Africa Transport Policy Program Working Paper No. 18, World Bank. Also note that these benefits are likely to involve transfers.

Box 5.5. Introducing Intermediate Transport Technology to Help the Rural Poor in Ghana

The Ghana First Transport Rehabilitation Project included a pilot program to introduce new intermediate means of transport (IMT)—the “missing middle” in most African transport systems. The purpose was to design, assemble, and test different forms of IMT. The design models were to be suitably modified and manufactured locally, mostly in the informal sector.

The pilot component focused mainly on introducing bicycle trailers and farm vehicles as an alternative to head-loading for the transport of produce from farm to market.

Rural women have been the main beneficiaries, since head-portage is generally done by them. Reception of these IMT vehicles, mainly the trailers, has been enthusiastic. The women in northern Ghana who did not previously ride bicycles have taken to bicycle riding. They use the trailers with bicycles or as pull-carts. Introducing IMT to the rural transport system can also help increase farm earnings through reduced transport costs and reduced spoilage, thereby increasing production incentives.

With a per capita income of about US\$220, the ability of the rural poor to invest in a US\$250 cycle-trailer combination is limited, although this investment will increase income for many years. A follow-up project, the Second Transport Rehabilitation Project, channels part of the wage earnings of rural women from Bank-financed road works into savings schemes run by NGOs to fund hire-purchase programs. A direct grant of initial seed money to NGOs and rural transport user associations is provided to start revolving funds for hire-purchase of vehicles.

Source: Excerpt from World Bank (1992), *Poverty Reduction Handbook*, Box A7.12, p. A7-13.

Promoting the Use of Non-Motorized Transport

5.24 Non-motorized transport (NMT) is heavily used by the poor, both in urban and rural areas. Non-motorized means of transport include bicycles, rickshas, pullcarts, etc. Projects that promote the use of NMT usually contribute directly to the improvement of the poor’s personal welfare. The World Bank’s attention to NMT development has been increasing. Some urban transport projects include NMT facilities as a component, and others introduce NMT to areas where there is no tradition of using NMT (Box 5.5).

5.25 Although NMT is a viable mode of rural transport for productive activities in many developing countries, acquiring non-motorized vehicles can be prohibitively expensive for the poorest rural population.⁵² The improvement of rural transport access often requires NMT vehicles to complement rural road investment. Recognizing this, some Bank projects finance loans on terms that would enable poorer households to purchase NMT vehicles (see Box 5.5).

⁵² I. Barwell, G.A. Edmonds, J. Howe and J. de Veen (1985), *Rural Transport in Developing Countries*, International Labor Organization.

5.26 Opportunities to help the poor finance NMT vehicles exist in urban areas as well. According to a study of travel characteristics of the urban poor in Delhi,⁵³ many low-income people spent more money than the bicycle cost in a year on bus fares for their journey to work, but they were not able to purchase a bicycle because they worked in the informal sector and did not have regular incomes. The lack of predictable incomes also made it difficult for them to secure loans that would enable them to buy a bicycle. Noting that approximately half of the households in Delhi lived on an income below the poverty line, moreover, the same study suggested that the total amount of annual public transit deficit incurred due to low fare policy was sufficient to provide a new bicycle for every household in Delhi below the poverty line.

Summary

5.27 The scope for direct assistance to meet the transport needs of the poor in both rural and urban areas is substantial and warrants far greater attention in relevant Bank transport projects. Targeted interventions can be more successful in rural areas because targeting is more effective, benefits are retained to a greater degree by the poor (compared to urban areas), and participation is more viable. To be more effective, direct assistance should be tailored to the specific needs of the communities of rural poor. Projects that improve rural basic accessibility (all-weather passability of local access roads) and intermediate means of transport should be the primary candidates for intervention.

5.28 Direct intervention in urban areas is more difficult. The design of urban transport projects should be based on sound analysis of the urban poverty profile, and the programs to help the poor must be designed to maximize selection and retention by the targeted groups. Self-selection can be effective where quality of service differentials are significant.

⁵³ A.G. Hathway and P.N. Dongre (1989), *Travel Requirements of the Urban Poor: A Study of the Low Income Settlements in Delhi*, Town and Country Planning Working Paper No. 13, Bristol Polytechnic, England.

6. IMPROVING THE TREATMENT OF POVERTY ISSUES IN TRANSPORT OPERATIONS

6.1 The primary purpose of the previous sections was to provide a sound conceptual framework for the development of a *pragmatic* approach to improving the treatment of poverty issues in the World Bank's transport sector operations. This section considers the treatment of poverty in recent Bank transport sector operations,⁵⁴ and identifies areas where further attention appears warranted. A checklist is suggested to assist transport staff in considering and treating poverty issues throughout the project cycle.

Major Issues in the Treatment of Poverty

6.2 The treatment of poverty issues in the World Bank's transport sector operations has been affected by the evolution of the Bank's approach to poverty reduction. The evolution followed the advances in understanding poverty issues and the effectiveness of public interventions. In the 1960s, the Bank focused on economic growth as the key to poverty reduction, and heavily emphasized investments in physical infrastructure. Later, attention shifted first to redistribution with growth, and then to satisfaction of basic human needs. During this process, however, the transport sector as a whole shied away from the forefront of the Bank's "war on poverty." The typical transport project was not regarded as a suitable vehicle for directly addressing poverty issues. The treatment of poverty in the transport sector, though improving over time, has remained quite limited.⁵⁵

6.3 The limited treatment of poverty issues in transport sector operations can be *partly* explained by the fact that most transport projects are designed to support economic growth, and only a small number of projects (mostly rural road and urban public transport projects) have components that target the transport needs of the poor. Since its founding, the Bank has been involved in more than 1,000 transport projects throughout the world totaling about US\$50 billion of investment. The common objectives of these projects have been to reduce transport costs for the distribution and export of products, to improve access to workplaces for workers from a wide geographical area, and to improve access to the sites of materials and other inputs. The Bank has financed projects that specifically develop links from farm to factory, to port and onto international markets. To the World Bank, transport investment is a crucial component of economic development, and economic efficiency has been emphasized as the primary objective of transport sector investments.

⁵⁴ The discussion draws upon a review of the World Bank's transport projects approved since FY88 regarding the treatment of poverty issues, which is briefly documented in Appendix 1.

⁵⁵ Alice Galenson (1991), *The Evolution of Bank Lending for Infrastructure*, a background paper for the World Bank Infrastructure Sector Policy Review, TWU-OR 6; World Bank (1991), *FY91 Transportation Sector Review*, Infrastructure and Urban Development Department, Report INU-OR 8; and World Bank (1992), *FY92 Transportation Sector Review*, Infrastructure and Urban Development Department, Report INU-OR 13.

6.4 It should be realized, however, that the limited treatment of poverty issues is also related to sometimes inadequate operational practices within the transport sector. Several problems contribute to the restricted attention given to direct opportunities for poverty reduction through transport operations:

- Weak links of transport sector appraisal work with country poverty and other sector work (for example, poverty assessments, health and education sector work)
- Little or no accounting for and/or setting of monitorable targets for poverty impact within appraisal and ex-post evaluation reports
- An uneven awareness among Bank staff as to the role that different transport investments can play in a country's overall poverty reduction strategy
- No specific guidelines covering circumstances and types of project for which explicit consideration of poverty issues should be undertaken
- Lack of a practical, systematic approach for addressing poverty issues in transport sector operations.⁵⁶

6.5 Overall, there is a clear case for systematically accounting for and, in some contexts, improving the contribution of the Bank's transport sector operations to the alleviation of poverty. There is also a need to relate certain transport investments to ongoing Bankwide efforts at poverty reduction and thereby exploit synergy (cross-regional and inter-sectoral). While economic efficiency should continue to be emphasized as the primary objective of transport sector operations, awareness of the scope to address poverty issues in transport projects should be significantly increased. Where a transport operation strictly involves an efficiency improvement (and hence any impact on the poor is indirect), major links to the poor (positive and negative) should be highlighted. These would include the influence of market structure on the transfer of benefits from transport service operators to users.

Areas for Improvement

6.6 Improved treatment of poverty issues in the transport sector rests with transport staff. However, staff efforts should be leveraged through the collaboration of all involved parties,

⁵⁶ On the policy side, the Bank has not offered clear guidelines for the treatment of labor redundancy. To promote the efficiency of transport, policy reform conditionality has been linked to Bank transport project and sector lending. A consequence of policy reform involving privatization of state-owned enterprises (for example, railways, bus companies, ports, and airports) has been labor redundancy. While layoffs of redundant workers have become a common result of Bank loans or elements of Bank conditionality, guidance provided to assist governments in this difficult task has been limited. The issue is politically sensitive and relevant to poverty problems.

including Bank management, staff involved in other sectors, borrowers, non-governmental organizations (NGOs), and beneficiaries.

Transport Sector

6.7 There are several major areas in which the Bank transport sector staff may be able to improve the approach taken to addressing poverty issues. These include:

- More systematic accounting of the distribution of impacts of projects, especially on the poor
- Amelioration or compensation for costs or harm imposed on the poor
- Heightened awareness of opportunities to incorporate project components that directly assist the poor
- Improved methods for measuring the value of project benefits to the poor (for example, NMT, passability, and deregulation).

6.8 In addition, transport sector work can be a practical tool for identifying the nature and extent of the transport needs of the poor and the possible options to meet those needs. Discussion of the travel needs of the poor should become an integral part of the sector work. In fact, there are some good examples. Sector work on urban transport in Nigeria and Uganda stressed the large number of trips made on foot and by bicycle by the poor, and suggested that better facilities for pedestrians and cyclists would make a significant contribution to improved mobility and road safety.⁵⁷ The Madagascar urban sector review described how long distances between home, school, and work obliged people to use public transport and how increases in fares had to be accommodated by cutting back on other expenditures or trips home at midday.⁵⁸

Beyond the Transport Sector

6.9 Addressing more thoroughly poverty issues in transport sector operations requires additional resources in terms of staff time and other support costs. Because of this, their incorporation should be pursued in a measured way, and efforts should not be limited to transport staff at the project level. Indeed, in order to achieve a significant improvement, staff participation should be widened to include:

- More active involvement of country teams so that the specific and complementary role of transport projects in poverty reduction, and the potential for direct assistance, are identified during the formulation of the Country Assistance Strategy (CAS)

⁵⁷ World Bank (1991), *Nigeria: Road Sector Strategy Paper (FY91)*, World Bank (1991), *Nigeria: Urban Transport in Crisis (FY91)*.

⁵⁸ World Bank (1991), *Madagascar: Urban Sector Review (FY91)*.

- Higher level emphasis on the direct as well as indirect role of transport projects in poverty reduction during the Bank's policy dialogues with borrowing member countries
- Extended use of the Bank's Living Standards Measurement Study (LSMS) database to improve understanding of the transport needs of the poor and to help evaluate the impact of transport projects on the poor.

The Bank's Operations Procedures

6.10 The success of targeted interventions requires greater resources for the preparation and supervision of poverty-focused projects (or project components). Operations procedures for transport projects focused on poverty may need to accommodate more task manager and project team inputs, more flexible contracting arrangements with small contractors, decentralized disbursement, and so on.

Collaboration with NGOs

6.11 There is broad scope for Bank transport staff to collaborate with NGOs for various tasks that would improve the treatment of poverty issues. Many NGOs worldwide are involved in a number of development activities, including advocacy, research, and training. Their activities have become an important contributing factor to the growing awareness of poverty issues. Because of their long-standing experiences at the community level, they are especially well placed to distill local needs and priorities, to identify appropriate technologies, and to assist local institutional development. All of these skills are valuable for transport operations that attempt to target the basic needs of the very poor on a sustainable basis. Therefore, Bank staff at all levels should strengthen collaboration with NGOs in identifying, designing, implementing, and monitoring targeted poverty programs.

Addressing Poverty Issues throughout the Project Cycle

6.12 Simply applying a checklist throughout the project cycle may help task managers probe the possibilities for identifying, approaching and, as warranted, implementing specific poverty components in transport projects.

Project Identification

6.13 During project identification, it is important to gauge and appreciate the poverty profile in the project-affected area. A poverty profile includes the income distribution of the affected population and indicators of the quality and accessibility to transport infrastructure and services (see Appendix 2 for some examples). Because identifying the poverty profile is crucial for understanding the transport needs of the poor and for defining the project objectives and components, even a simple accounting of the poverty profile at the beginning can be very helpful for the treatment of poverty issues in subsequent stages of the project cycle (Box 6.1).

Box 6.1. Selecting Road Improvement Components for Poverty Alleviation

Two recent Bank-financed highway projects in China (Second Henan Provincial Highway Project, 1996, and Second Shaanxi Provincial Highway Project, 1996) included a poverty-focused component. The component was proposed in line with the provincial government programs of Road Improvement for Poverty Alleviation (RIPA), which aimed to provide all-weather access, through rehabilitation, upgrading, and construction of rural roads, to a main provincial road axis for every poor county township and the majority of villages.

A three-stage screening procedure was developed to select rural roads to be included in the project's RIPA component. The first stage of screening identified the "priority counties" that were most in need of improved road transport as an element in alleviating their poverty. The criteria used to prioritize included average income per capita, number of the "very poor" per 10,000 population, value of agriculture production, value of mineral production, and other social development indicators (including literacy rate, health workers per thousand population, and access to clean drinking water).

The second stage of screening used a cost effectiveness criterion to select rural road systems from these priority countries. In this stage, rural roads for improvement in these countries were grouped into the RIPA systems based on three criteria: (1) continuity of the system; (2) maximization of the population served; and (3) connectivity to as many settlements as possible. Then a cost effectiveness criterion—the proposed investment cost divided by population served in the influence area of the system—was used to screen the RIPA road systems. The very high unit cost systems were dropped. Finally, available financial resources were taken into consideration in deciding the number of systems and size of the RIPA packages that passed this stage of the screening.

The third stage of screening consisted of an analysis of the economic and social benefits of each of the road systems included for consideration at the end of the second stage. The analysis also included a review of motorization trends to guide the selection of proper road class and road engineering design that would meet the future needs of both motorized and non-motorized traffic in these rural areas.

Sources: World Bank (1996), *China: Second Henan Provincial Highway Project*, Staff Appraisal Report; and World Bank (1996), *China: Second Shaanxi Provincial Highway Project*, Staff Appraisal Report.

6.14 In order to understand the transport needs of the poor, the following major issues warrant consideration, as appropriate to each specific project:⁵⁹

- What sort of data are needed to evaluate poverty components?
- How does the availability of transport services in urban areas facilitate job searches and access to employment (paying particular attention to the needs of

⁵⁹ Based upon World Bank (1991), *FY91 Transport Sector Review*, Infrastructure and Urban Development Department, Report INU-OR 8, p. 26.

women who must often combine child-care duties with out-of-home employment)?

- How does the provision of transport infrastructure and services (motorized and non-motorized) help the poor gain access to schools, health care facilities, and other public services?
- How does the prevailing policy framework and regulatory regime, as well as targeted non-discriminatory subsidies, deregulation (especially removal of barriers to entry), and expanded competition affect the mobility and transport costs experienced by the poor?
- What is the scope for using labor-based construction and maintenance techniques for small-scale rural road works?
- How could the impact of rural access on rural incomes, labor participation rates, and provision of health care services be estimated?
- Can land-use controls, zoning, provision of basic rates and services, and basic housing, be addressed so as to reduce the transport needs of the poor?

6.15 Besides the transport needs of the poor, it is important to understand the market structure within which a proposed transport project would operate. As discussed earlier, market structure is important because it is a crucial determinant of the size of project benefits and the extent to which they accrue to users, as well as the final incidence of costs and benefits. Market structure is defined by a number of key variables: number of sellers, number of buyers, standardized or differentiated character of the product or service, conditions of entry, and presence of government regulation. A table outlining these major elements of the relevant transport market(s) and regulations can be very useful in project design.

Project Design

6.16 In shaping the project design the following questions should be raised: What technological options are available to address the transport needs of the poor? Can measures be taken to increase the flow of project benefits to the poor? The design of project components should consider explicitly the needs of the poor. Design standards for simple non-motorized vehicles (NMVs) such as oxcarts, bicycles, and bicycle trailers are an important consideration. Also pertinent here is assessment of safety and the benefits and costs of separation of motor vehicles from NMVs and pedestrians.

6.17 During the project design process, it is also important to consider measures that protect the poor against the adverse effects that a transport project may have. In particular, efforts should be made to minimize the amount of resettlement and mitigate the undesirable effects of unavoidable resettlement by ensuring that people displaced are resettled expeditiously and fairly.

Project Appraisal

6.18 The benefits from poverty-focused investments should be estimated across all alternatives. This requires careful investigation into how the poor use, and could use, transport facilities. With the objective of poverty reduction in mind, the distributive impact of each alternative under comparison should be identified, together with its corresponding EIRR. The results for project alternatives should be discussed with the borrower.

Policy Reform Conditionality—The Case of Subsidies

6.19 In considering policies involving transport subsidies, borrowers should be encouraged to address the following questions: (a) What are the real effects of the subsidy in terms of costs and benefits, both direct and indirect? (b) Who are the real, ultimate beneficiaries and who really pay the costs? (c) Are the effects compatible with a poverty reduction objective? and (d) Are there alternative ways of achieving the objective of assisting the poor, and how do these compare in effectiveness with the existing subsidies?

Impact Monitoring and Performance Indicators

6.20 An objective of monitoring project impact is to determine the extent to which the project reduces poverty relative to what would have happened in the absence of the project. Thus, evaluation requires the specification of a counterfactual; since the counterfactual is not observed, the techniques for specifying it require careful thought.⁶⁰

6.21 Perhaps the most challenging task in impact monitoring is to estimate the project benefits flowing to different income groups. There are two general approaches to estimating benefit incidence: the cost surrogate method pioneered by Meerman and Selowsky,⁶¹ and the behavioral approach.

6.22 The cost surrogate method is simple and widely used. Its application in transport project performance monitoring requires a knowledge of the income distribution among the persons affected by the project before the project and the average level of use of the relevant infrastructure service by each income group. The benefit of using the service by each income group is estimated by the product of the average level of use of the income group and the unit cost of providing the service. The benefit is then compared with the pre-project income levels to give indications of the levels of welfare improvement among income groups. One obvious problem with this method is that it ignores the behavioral response to the targeted interventions. Moreover, estimated income may not be an accurate measure of

⁶⁰ Lyn Squire (1995), "Evaluating the Effectiveness of Poverty Alleviation Programs," in World Bank, *Evaluation and Development: Proceedings of the 1994 World Bank Conference*.

⁶¹ Jacob Meerman (1979), *Public Expenditure in Malaysia: Who Benefits and Why*, Oxford University, and Marcelo Selowsky (1979), *Who Benefits from Government Expenditure? A Case Study of Colombia*. Oxford University Press.

welfare level in developing countries because of the heavy presence of the informal sector and of self-employment. Nonetheless, the method is more suitable for rural projects.

6.23 The behavioral approach attempts to measure welfare improvements by tracing responses in a general equilibrium framework. However, data and modeling requirements severely limit the viability of this approach in developing countries, especially for transport sector operations where the intersectoral links involved in the flow of benefits to the poor can be extensive. In urban transport, a reasonably high quality, disaggregate urban travel demand model, which is often used in urban transport planning and project evaluation, may offer a way to simulate the counterfactual that allows estimation of the behavioral changes resulting from the project.

6.24 While both the cost-surrogate and behavioral methods can be useful tools for measuring poverty impact of transport projects, their application will be limited because of the in-depth data collection required. In many cases, it may not be cost-effective to use these methods to monitor transport projects that are focused on efficiency.

6.25 In most cases, the use of a small set of performance monitoring indicators may be more effective. This is in line with Bank Operations Manual and Administrative Guidelines.⁶² A good set of performance indicators can usually provide relatively low-cost information. The selection of indicators is very important for ensuring that project performance will be measured easily and precisely.⁶³

6.26 Indicators designed for measuring the poverty impact of a transport project should be included in the performance indicators system developed to measure project performance. In general, there are three classes of indicators: (a) *input* indicators that measure the means by which the project is implemented; (b) *process* indicators that measure the extent to which the project is delivering what it is intended to deliver; and (c) *impact* indicators that measure the project's impact upon the living standards of the project beneficiaries.⁶⁴ For most transport projects, the indicators that measure the poverty impact fall into the third class.

6.27 The selection of a set of indicators will differ from project to project. In general, the indicators should provide information relating to travel time and cost for different trip purposes by different modes. In some cases, a few key indicators may be sufficient. For a rural road transport project that aims to improve accessibility to basic social services, a key

⁶² For example, as set out in Operations Memorandum 1/96 and Bank Procedure 10.0 (Annex).

⁶³ For guidelines covering the selection of performance indicators, see Colin Gannon and Zmarak Shalizi (1995), *The Use of Sectoral and Project Performance Indicators in Bank-Financed Transport Operations, A First Edition Note*, The World Bank; and Dennis Casley and Krishna Kumar (1987), *Project Monitoring and Evaluation in Agriculture*, Johns Hopkins University Press.

⁶⁴ Soniya Carvalho and Howard White (1995), *Performance Indicators to Monitor Poverty Reduction*, World Bank ESP Discussion Paper, No. 67.

indicator would be average travel time to facilities such as market, school, health care facility, and primary transport network (rail station, long-distance bus station, etc.), by affordable modes. Another would be days of impassability over a period of one year.

APPENDIX 1

A REVIEW OF THE WORLD BANK'S TRANSPORT SECTOR OPERATIONS

Introduction

1. This appendix reviews the World Bank's transport sector operations with regard to attention for poverty reduction. The purpose of the review is to provide an overview of operational experience and practice as well as to illustrate the source of many of the issues raised in the main text of this paper. This review was prompted by the finding of a 1995 Bank Operations Evaluation Department study that there was little formal accounting for poverty in Bank transport operations.⁶⁵

2. The OED report gave staff's use of poverty analysis low ratings, with almost two-thirds of the staff appraisal reports lacking sufficient evidence to ascertain what share of project benefits were expected to reach the poor. Although the sample of transport projects analyzed was given high quality marks for general economic analysis (80 percent), when it came to accounting for incidence of costs and benefits (or even the income levels of expected beneficiaries) less than 10 percent were given high ratings. Even qualitative analysis of the explicit poverty impact was very limited.

3. In this review, primary attention was given to how Bank-financed transport projects were designed to contribute to poverty reduction and to the performance of those projects in terms of the stated poverty reduction objective.

Methodology

4. The methodology for this review involved two major steps. In the first step, the Bank Lending Operations Database was interrogated. The database contains project summary documents for all projects approved since FY88 in the six regions of the Bank.⁶⁶ These documents were used to identify projects with objective in poverty alleviation and/or with discussion of poverty issues. The projects in the database can be classified by program objective, sector (or subsector), and country. There are five program objectives used by the Bank for categorization purpose. These are: (a) poverty alleviation; (b) economic management; (c) environment; (d) private sector development; and (e) women in development. As of April 1997 there were a total of 957 projects (all sectors) with poverty alleviation as *one* of the program objectives.

⁶⁵ World Bank (1995), *A Review of the Quality of Economic Analysis in Staff Appraisal Reports for Projects Approved in 1993*, Operations Policy Department and Operations Evaluation Department.

⁶⁶ The six regions are Africa, East Asia & Pacific, South Asia, Europe & Central Asia, Middle East & North Africa, and Latin America & the Caribbean.

5. The second step involved a more detailed review of staff appraisal reports and implementation completion reports for a number of selected projects. This detailed review was intended for assessing the scope of, and attention to, the treatment of poverty issues in the transport sector operations.

A Review of the Bank Transport Projects Approved since FY88

6. The transport sector is divided into seven subsectors: highways, ports and waterways, rural roads, urban transport, aviation, railways, and other transportation. As of April 1997, there were a total of 236 transport sector projects listed in the database, 81 of which had poverty alleviation as one of the program objectives. This represented 34 percent of the all transport projects and 7.3 percent of all Bank projects with a poverty alleviation objective. Table A.1 gives the distribution of transport projects across seven subsectors:

Table A.1: Transport Projects with Poverty Objective, 1988-97

Subsector	Total Number of Projects	Number of Projects with a Poverty Alleviation Objective	Percent of Total
Highways	117	40	34.2
Ports and Waterways	28	9	32.1
Rural Roads	10	6	60.0
Urban Transport	23	10	43.5
Railways	25	5	20.0
Aviation	7	3	42.9
<u>Others</u>	<u>26</u>	<u>8</u>	<u>30.8</u>
All ^{1/}	236	81	34.3

^{1/} Some projects are double counted because they involve more than one subsector.

Source: Drawn from the World Bank Lending Operations Database.

7. Only 22 projects among all 241 transport projects included in their project summary documents a *discussion* of poverty issues. Among the 81 transport projects with poverty alleviation as one of the program objectives, only 15 projects included a discussion of how the project components would contribute to poverty reduction and explicitly stated poverty reduction as one of the several project objectives.⁶⁷ Among the 155 transport projects

⁶⁷ All individual project summary documents contained in the database follow a similar format and provide a more detailed description of project objectives and project components. The project objectives specified here are different from the program objectives. The former are the more substantive, more precise objectives to be achieved by the project. Program objectives are used to categorize the project for Bank project portfolio management purposes.

without poverty alleviation as a program objective, only seven projects included a discussion of the poverty issues.

8. A careful review of the 22 projects that discuss poverty reveals that, in most of these projects, poverty reduction was only one of the secondary objectives. Except for some rural and urban transport projects, there was little evidence that the design of these projects centered around poverty reduction, or that there was a systematic approach to poverty issues. For some projects, the project-affected area was within a poor region. Although they were quite diversified in terms of type of transport infrastructure financed and the role of project in helping the poor, the 22 projects exhibited some similarities in the treatment of poverty issues.

9. Fifteen of the 22 projects are in the rural roads and urban transport subsectors. All rural road projects focused on the construction, rehabilitation, and maintenance of feeder roads or access roads. Some were stand-alone rural road projects; some constituted part of government effort to alleviate rural poverty, increase agriculture production, and facilitate provision of social services. Some also attempted to reduce rural poverty by creating rural employment directly through labor-intensive road works, including employment of women.

10. The poverty alleviation rationale within the project design of these projects is a familiar one. The projects are expected to alleviate rural poverty and raise living standards of rural communities through increased access to basic social and economic and income-generating activities. The specific objectives, as stated in these projects, are to: (a) reduce transport costs and raise the reliability of vehicular access (reduce the risk of impassability) and thereby to expand markets for agricultural and non-farm products; (b) integrate poorly accessible zones with regional economic centers; (c) improve transport conditions in rural villages; (d) generate employment through the rehabilitation and maintenance of rural roads to mitigate rural poverty; and (e) build up institutional capacity at local government level and develop small- and medium-size enterprises to manage and execute, on a sustainable basis, the maintenance and minor upgrading of rural roads.

11. The urban transport projects with an objective in poverty reduction recognized three common problems confronted by the urban poor: (a) poor access to jobs and public transit, (b) low level of affordability, and (c) traffic safety risks that exposed the poor disproportionately. Accordingly, the project components designed to contribute to poverty reduction included improvement of access to jobs and public transport in the low-income area to reduce travel time and cost, provision of safer and more comfortable public transport to reduce accidents, and the provision of pedestrian and NMT facilities as an affordable means of transport for low-and middle -income people.

12. There are projects in other subsectors that were proposed to serve as public investments to stimulate economic growth in stagnant areas. For example, the Cape Verde Transport Infrastructure Project (1993) had a component to alleviate poverty in Fogo Island through the rehabilitation of Vale De Cavaleiros port.

13. In some cases, attention to poverty issues emerged because the proposed project was located in areas where the poor lived. For example, the Indonesia Earthquake Reconstruction Project (1993) was proposed to assist the island of Flores. Since Flores is in the poorest province of Indonesia, the project fits well with the poverty reduction focus of the Bank's assistance strategy for Indonesia.

14. A common characteristic of these projects is that they were concerned with the *sustainability* of transport improvements to the poor. Some attempted to ensure improvements be sustained by developing and implementing cost recovery policies, building and utilizing indigenous capacity in the public and private sectors, and improving financial management and control. For example, a few rural roads projects aimed to establish the institutional and financial arrangements (such as a road fund and roads board) for administering and maintaining rural roads on a sustainable basis.

A Review of Poverty Targeted Projects with a Transport Component

15. The Bank has many *multi-sectoral* projects for poverty reduction, some of which include a transport component. Among the 212 projects approved since FY88 that explicitly stated poverty reduction as one of the project objectives, some 30 projects, representing 14 percent of the total, involved a transport component.

16. All of these 30 projects are located in poverty areas. They are multi-sectoral projects in three categories: rural development, urban development, and social sector development. The size of the transport component in the comprehensive investment package varies project by project, ranging from 5 percent to almost 50 percent of the project's base cost.

17. These projects demonstrate that the role of transport investments in poverty reduction can differ, depending on the approach adopted for poverty alleviation. In general, the approaches taken are quite similar within the same sector. For example, the projects in the urban development sector tend to improve the transport conditions of the poor through street paving and lighting, rural development projects tend to provide better transport to improve poor farmers' access to markets and social services, and the social sector projects use labor-intensive transport construction and/or maintenance as a way of generating employment opportunities and supplementary income for the poor.

18. In general, given the comprehensive nature of these projects, the types of transport infrastructure investments proposed appear to be basic and focus on existing facilities, such as street paving and rural access roads. These require modest technical assistance in planning, design and implementation.

19. Among these 30 projects, 15 are rural development projects. They all aimed to improve the socio-economic condition of the poor groups in the population by providing and improving essential infrastructure and basic social services. The transport components in these projects are all related to *rural roads*. The components involve mostly the rehabilitation and maintenance of feeder roads, access roads, bridges, and village streets.

20. There are 10 urban development projects involving transport components that are all targeted at the poor segment of the population in cities. Specifically, these projects aimed to provide and improve basic infrastructure in the poor neighborhoods—mostly urban street paving and lighting.

21. There are only three social sector development projects and these focused on the development of social sector capability to generate employment. Rural road rehabilitation and maintenance, and urban street paving were used as a catalyst or pilot scheme for this purpose. For example, the Sri Lanka Poverty Alleviation Project (1991) assisted a rural work fund for building economically viable infrastructure and creating wage employment.

APPENDIX 2

DATA FOR THE EVALUATION OF THE POVERTY PROFILE IN A PROJECT-AFFECTED AREA

The following indicators *by income groups* are suggested for consideration during project preparation and the design of project performance monitoring indicators system:

Average household income
Household total expenditures
Household transport expenditures

Journey to work	Frequently used mode(s); motorized and non-motorized Number of round trips per day Out-of-pocket cost Average travel time per round trip
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Other trips	Frequently used mode(s) Number of round trips per day Out of pocket cost Average travel time per round trip
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Percent of population affected by project

Project impacts	Increased service availability? (frequency) Reduced impassable days (p.a.) Increased speeds? Shorter distance? Lower out-of-pocket cost? Higher level of comfort? Worsened environmental quality
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