NBER WORKING PAPER SERIES

AN ALTERNATIVE VIEW OF TAX INCIDENCE ANALYSIS FOR DEVELOPING COUNTRIES

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Working Paper No. 3375

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
June 1990

NBER Working Paper #3375
June 1990

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ABSTRACT

This paper revisits the long-standing issue of the incidence of taxes in developing countries. Its central theme is that despite many decades of studies, tax incidence analyses for developing countries continue to be based upon the same shifting assumptions used in developed country studies, despite some obvious pitfalls. Taxes are assumed to be shifted forward to consumers, or backwards onto factor incomes, as has been the case for developed country tax incidence work from Bowley and Stamp to Pechman and Okner. Developing countries typically have a much different non-tax policy and regulatory environment from developed countries, with higher protection, rationed foreign exchange, price controls, black markets, credit rationing and many other features. The paper argues that all these features can greatly complicate and even obscure the incidence effects of taxes in developing countries. For several taxes, taking such features into account can reverse signs and/or substantially revise estimates of incidence effects from conventional thinking and by substantial orders of magnitude. A final section sets out some implications for country lending programs, both by type of country and level of development, and comments on how the extent to which non-tax policy reform has already been implemented affects the significance of the points raised here.

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I. Introduction

This paper revisits the long-standing issue of the incidence of taxes in developing countries (see Bird and de Wulf (1973), de Wulf (1975) and McLure (1977) for earlier discussions). Tax incidence analyses thus far performed for developing countries largely involve mechanical replication of conventional developed country analyses.[1] This tradition continues to be followed even though developed country tax incidence results have, themselves, been challenged in a number of important ways in recent years. The paper comments on the usefulness of results of such analyses, particularly when evaluating incidence effects accompanying wider structural reforms in developing country tax systems.

Many potential pitfalls arise in applying developed country incidence techniques to developing countries. Those stressed here largely arise from interactions between tax policies and non-tax features of the policy and regulatory environment including, protection, rationed foreign exchange, price controls and black markets, and credit rationing.

The paper provides several illustrations as to how misleading conclusions can be drawn from studies that ignore these developing country features. Their incorporation can sometimes reverse the incidence pattern of taxes relative to what is often taken to be conventional wisdom, and even where reversals of pattern do not occur quantitative differences can be major. A concluding section of the paper discusses some of the implications of some of the "newer" views of incidence emerging from the paper for tax restructuring options under discussion in several developing countries.

Earlier versions of this paper were presented at a seminar at the World Bank in July 1989 and the World Bank Conference on Tax Policy in Developing Countries in March 1990. We are grateful to Javad Khalilzadeh-Shirazi, Richard Musgrave, Charles McLure, Richard Bird, Bela Balassa and Nicholas Stern for comments and to Jaber Ehdaie and John Brondolo for assistance in preparing the tables in Appendix A.

II. Tax Incidence Analysis for Developed Countries

The studies of the redistributive effects of taxes in developed countries on which comparable studies in developing countries are based all involve numerical calculations of annual tax incidence.[2] They make various assumptions as to how components of the tax system are shifted onto consumers, producers, factor owners, and other groups, typically focusing on five key tax groups: income, corporate, sales and excise, property and social security taxes. Each is treated as having sources and/or uses side effects, which reflect how any given tax is assumed to be either partly or fully borne by one or more elements of income on the sources side (i.e. capital income, labor income and transfers), or by households on the uses side (i.e. according to the way they spend their income, reflected in savings and expenditure patterns by household). In the literature the terms 'shifting assumptions', 'incidence assumptions' and 'sources and uses sides effects' all refer to these treatments adopted for the allocation of tax burdens. These terms are used interchangeably here, although we predominantly use the term 'shifting assumption'.

Three main income sources are assumed to bear the burden of taxes in these studies: capital income, labor income and transfers. In annual data, transfers are heavily concentrated in the lower tail of the income distribution, capital income in both the upper and lower tails (owing to the presence of retirees), while labor income is closest of the three series to being proportional to income. Thus, depending upon whether the sources side effects of a tax are allocated to capital income, labor income, transfers, or to income in general, a progressive or regressive effect can result. On the uses side the key feature is differential savings rates by income range. Since around 40 percent of household savings are concentrated in the top 10 percent of the income distribution, taxes that are treated as borne by consumers of taxed products produce regressive incidence effects.[3]

Thus, the sources and uses effects of taxes appearing in these incidence calculations reflect their allocation to the various components of annual household budget constraints, written for simplicity as

$$C + S = K + L + Tr - PT \qquad (1)$$

where C and S denote consumption and savings respectively, and K, L, Tr, and PT are capital and labor income, transfers, and personal taxes. Uses side effects of taxes across households primarily arise as consumption to savings ratios differ by household. Sources side effects arise where the composition of income is different by income range.

Incidence estimates for whole tax systems reflect separate incidence calculations by income range for each tax, which are then summed across taxes. In combination, they yield an average total tax rate for each income range. The extent of redistribution through the tax system is evaluated by examining the pattern of average tax rates by income range. It is widely agreed that net redistribution involving expenditures and taxes may be of more interest than tax incidence alone, and that lifetime rather than annual incidence calculations should form the basis for evaluating tax reform initiatives, but data limitations are frequently cited as reasons why they are not made.[4]

As usually summarized in public finance texts and other sources, the major finding from these studies is that the tax system does little to redistribute income. One widely cited set of incidence calculations are those due to Pechman and Okner (1974) for the U.S. They use a detailed merged 1966 data file of approximately 87,000 income tax returns and 30,000 households in a U.S. Survey of Economic Opportunity data file. Alternative incidence calculations are made reflecting different shifting assumptions. They conclude that regressive and progressive taxes in the U.S. tax system roughly offset each other, and furthermore that this finding is little affected by the choice of shifting assumption used in the calculation. This Pechman-Okner conclusion, often referred to as the "Proportionality Hypothesis", is widely cited and has been a major element in tax reform debates in the United States and elsewhere. The same theme also emerges from results of other developed country incidence studies.

The conclusions from this work, while regarded as the mainstream view of developed country tax incidence, have nonetheless also been the subject of much controversy and debate in recent years. Gillespie (1980) in work on Canada, for instance, reaches the conclusion that the tax system is 'regressive over the upper income classes' (p.170). In reaching these conclusions, he stresses net fiscal incidence (the value of benefits from government expenditures, less the taxes borne by income range) rather than

simply tax incidence. In his tax incidence analysis, he largely limits himself to a single set of shifting assumptions but importantly uses a different income concept from Pechman-Okner. The exclusion of transfers in the income concept is a major factor underlying his results.

Browning (1978) and Browning and Johnson (1979), are critical of Pechman-Okner proportionality hypothesis in the other direction, arguing that the tax system should be viewed as progressive. The main difference in their work relative to Pechman-Okner lies in their treatment of sales and excise taxes and in the income concept they use.[5] Browning and Johnson argue that uses side effects due to differential savings rates by income range largely disappear when savings out of lifetime rather than annual income are considered. They therefore only consider sources side effects of indirect taxes. Furthermore, they point out that since transfers are largely indexed for changes in the price level only factor incomes can bear the burden of indirect taxes passed forward as higher prices. The concentration of transfers in the lower tail of the income distribution and savings in the upper tail means that sales taxes and excises are regressive in Pechman-Okner type incidence calculations, but progressive in the Browning-Johnson work. This change is enough to produce an overall pattern of average tax rates by income range that is progressive, rather than proportional as in Pechman-Okner.

The key shifting assumptions used in some of these calculations are displayed in Table 1, along with an indication as to which produce progressive or regressive incidence results. As can be seen, the major areas of disagreement centre on the corporate, property, and sales and excise taxes.[6] The income tax is uniformly treated as paid by income recipients and is progressive due to increasing average tax rates. Social security and related contributions are treated as payroll taxes on labor and, outside of the lower tail of the income distribution, are regressive due to the ceilings on contributions. Corporate and property taxes are regressive if treated as shifted 'forward' to consumers, but progressive if assumed shifted 'backwards' to recipients of capital income.[7] Corporate taxes are even more progressive if assumed borne by capital income specific to taxed industries rather than capital income in general, because of light tax treatment of widely held housing capital. In some literature, this motivates the use of dividends rather than all capital income (which

TABLE 1

INCIDENCE ASSUMPTIONS USED IN DEVELOPED COUNTRY TAX INCIDENCE CALCULATIONS AND THEIR EFFECTS ON TAX INCIDENCE PATTERNS

Incidence pattern	Most progressive	Most regressive	Shifting assumptions by Tax	P/O most redistributive case[a]	P/O least redistributive basic case[a]	Gillespie's basic case[b]	B/J competitive case[c]	B/J alternative case[c]
P			A) Individual income tax: (not shifted) allocated to taxpayers according to income taxes paid.	X	X	X	X	X
			B) Corporation income tax:					
P			- to capital income in general				X	
P	X		- half to capital income in general; half to dividends (stockholders)			X		
A		X	- half to capital income in general; half to total consumption		X			
P			- half to capital income in general; half to factor incomes	X				X
A			- half to dividend income; half to total consumption					
			C) Property taxes:					
			i) on land					
P			- to capital income in general			X	X	
P			- to landowners	X	X			
P	X		- to capital owners					
P		X	- half to capital income in general; half to factor income					X
			ii) on structures and improvements					
P	X		- to capital income in general	X			X	
R		X	- to shelter and consumption		X	X		
P			- half to capital income in general; half to factor income					X
			D) Sales and excises					
R		X	- to consumers of taxed goods	X	X	X		
P	X		- to factor incomes				X	X
			E) Social security					
			i) on employees					
A			- to employee compensation	X	X	X	X	X
			ii) on employers					
A			- to employee compensation	X		X	X	
A		X	- half to employee compensation; half to consumption		X			
P	X		- half to employee compensation; half to factor income					X

a P/O refers to Pechman and Okner (1974).
b Gillespie refers to Gillespie (1980)
c B/J refers to Browning and Johnson (1979).

NOTE: The first column of the table indicates whether a particular shifting assumption results in a progressive (P), regressive (R) or ambiguous (A) pattern; ambiguous being when two opposite patterns occur across income classes.

includes dividends) as a more progressive distributive series for allocating corporate taxes. Sales and excise taxes are regressive if borne by consumers, and progressive if borne by recipients of factor incomes.[8]

The sensitivity of incidence results to the choice of shifting assumptions in developed country tax incidence calculations is a point that is also developed in Whalley (1984). He reports a series of alternative incidence calculations for Canada, all based on the same 1972 microconsistent demand, production and tax data set, originally constructed for general equilibrium tax policy modelling (see St. Hilaire and Whalley, 1983). Using these data the main features of the various incidence calculations referred to above are reproduced, and even more extreme shifting assumptions, reflecting different implicit models, used to dramatically illustrate the sensitivity of tax incidence conclusions to shifting assumptions.

Whalley reports a number of variations on a set of central case assumptions and calculations which show how the tax system can be made to appear either sharply progressive or sharply regressive. The assumptions used in this central case variant are deliberately kept simple. The individual income tax is assumed borne by income recipients, with no uses side effects from the tax. Capital income is assumed to bear corporate and property taxes, irrespective of which industries capital is used in; an assumption of a long-run equilibrium situation with intersectorally mobile capital. Sales and excise taxes are assumed borne on the uses side in proportion to taxed consumption. Social security taxes are borne by labor income, with the ceiling on contributions yielding a regressive pattern.

The incidence results implied by these assumptions are reported in Table 2. Using central case incidence assumptions, total tax rates increase from 27.5 percent to 43 percent moving from the poor to the rich, showing a mild degree of progression intermediate to the Pechman-Okner and Browning calculations discussed earlier. Income tax rates reflect average tax rates by income range and are progressive. The incidence of the corporate and property taxes reflect the capital income distribution. Increasing savings rates by income range produces a regressive pattern of sales and excise tax rates. Because of ceilings on annual contributions for social security taxes, tax rates beyond the lower income ranges are regressive.

Whalley then shows how a number of changes in incidence assumptions can make the tax system appear substantially more progressive. The central case assumptions yield three progressive and two regressive taxes. To make the tax system more progressive, one has to find justifications for increasing the progressivity of existing progressive taxes and curtailing the regressivity of other taxes. Whalley reports a sequence of modifications to the central variant whose combined effect is to produce sharp progressivity in the incidence calculation for the whole tax system. These change the range of average tax rates from 27.5 to 43 percent (the central variant) to 11 to 70 percent (Panel B of Table 2), implying such sharp progressivity that one might easily conclude that the tax system is significantly redistributive.

This is done by treating savings as the purchase of an annuity yielding both a future consumption stream and future tax liabilities. The introduction of Browning's indexation adjustment for sales taxes introduces further progression from the sources side. Incorporating an inflation tax on savers further increases tax rate progression and treating social security contributions as a benefit related charge, with contributions offsetting benefits received over the lifetime removes an element of regressivity from incidence calculations. While deliberately constructed so as to produce marked progression in the incidence calculation, Panel B obviously provides a different perception of the redistributive impact of the tax system compared with either the Pechman-Okner or Browning-Johnson calculations.

However, Whalley shows how it is also possible to change shifting assumptions further to make the tax system instead appear sharply regressive. A number of different arguments are discussed by Whalley, such as international mobility arguments, under which capital does not bear the burden of any taxes including personal taxes on capital income. The treatment of human capital is another issue discussed by Whalley. If capital cannot bear the burden of taxes due to international mobility considerations, and human and non-human capital are substitutes in production, incidence analysis can produce tax rate profiles that are highly regressive. Panel C of Table 2 reports results from the most extreme of the regressive incidence variants reported by Whalley, with tax rates falling from 99% for the poorest group to 15% for the richest.[9]

Table 2

WHALLEY'S (1984) TAX INCIDENCE CALCULATIONS FOR CANADA

	A. Using Central Case Assumptions and Income Concept a/							B. Most Progressive Incidence Treatment b/	C. Least Progressive Incidence Treatment c/
1972 Household Income classes	Personal Income Tax	Corporate Income Tax	Property Tax	Sales and Excises	Social Security	Production Tax	Total Tax Rate (all taxes)	Total Tax Rate	Total Tax Rate
Under $ 6,500	1.6	3.3	3.3	16.3	2.6	0.3	27.6	11.8	99.8 d/
6,500- 7,500	4.5	4.2	4.2	15.0	4.6	0.2	32.7	19.8	70.1
7,500- 8,500	7.0	3.6	3.6	14.8	6.1	0.2	35.4	23.0	62.2
8,500-10,000	9.5	2.8	2.8	14.2	5.6	0.2	35.0	25.5	51.2
10,000-11,500	10.8	3.2	3.2	13.9	4.7	0.3	36.1	27.5	44.1
11,500-13,000	12.3	2.7	2.7	12.8	4.5	0.3	35.3	30.3	42.2
13,000-14,500	13.5	2.6	2.6	12.5	4.2	0.2	35.6	32.0	38.9
14,500-16,000	14.7	2.5	2.5	11.9	3.9	0.2	35.7	35.0	38.0
16,000-18,500	15.2	3.6	3.7	11.5	3.6	0.2	37.8	38.3	35.1
18,500-21,000	14.9	3.4	3.5	11.9	3.2	0.2	37.1	37.9	34.6
21,000-25,000	16.9	3.4	3.5	10.4	2.9	0.2	37.9	44.4	31.1
25,000 and over	16.5	8.4	8.4	7.4	2.2	0.1	43.0	70.6	15.9

a/ Income is gross of income tax, gross of transfers, with a further adjustment for the tax treatment of imputed housing income.

b/ Adds future capital and income taxes to the central variant with Browning's adjustment for current period sales and excise taxes. Furthermore, inflation taxes on savers are included; allocation of corporate taxes are based on dividends rather than capital incomes and social security taxes are treated as benefit taxes and excluded from incidence calculations

c/ Human capital case: unimproved labor income is assumed equal for each wage earner, capital income does not bear the burden of capital taxes, and the portion of income tax allocated to capital.

d/ This extreme tax rate is a special feature of the most regressive incidence treatment involving assumptions on human capital and capital mobility, and is more fully discussed in Whalley (1984).

Source: Whalley (1984)

These calculations therefore emphasize the wide confidence ranges that need to be used in interpreting tax incidence calculations in developed countries. The natural corollary is that many issues of implicit theorizing need to be settled before further incidence calculations can be meaningfully interpreted. Thus, even before applying developed country incidence techniques to developing countries, recent literature emphasizes that one needs to exercise a fair degree of caution because of the key role played by incidence assumptions in determining results.

An issue raised by these concerns over the choice of shifting assumptions is whether more progress can be made by replacing the implicit models which underlie most incidence studies by explicit numerical general equilibrium models in which production, demand and elasticity parameters are explicitly represented (this is the applied general equilibrium approach set out in Shoven and Whalley (1984)). Building an explicit general equilibrium model allows the 'arbitrariness' of shifting assumptions to be replaced by an explicit choice of elasticities and model form. General equilibrium models have the virtue that they explicitly specify both the model and the parameter values and also take into account the deadweight loss of the tax system when calculating incidence. Their weakness is that many alternative forms of an equilibrium model are available, and available literature does not provide a rich base of parameter estimates on which to draw. The arbitrariness of shifting assumptions is thus, to some degree, replaced by the arbitrariness of both model form and parameter values.

Only one of the general equilibrium tax models constructed thus far has been used to make an incidence calculation for the whole tax system. Using their model of the U.K. economy and the tax-subsidy system, Piggott and Whalley (1985, Table 7.6) report a central case calculation in which the gain to the top decile from replacing the 1973 U.K. tax and subsidy system by a yield-preserving neutral tax is in the range of 20-25 percent of disposable income, with a similar loss to the bottom decile. While there are many features of their model that can be queried, their results also suggest qualifications to the proposition that, using annual data, the incidence of taxes is proportional. These results therefore tend to support the proposition that, beyond concerns over incidence assumptions, work on tax incidence in developing countries should also explore the use of numerical general equilibrium techniques.

III. Previous Tax Incidence Studies of Developing Countries

Concerns over equity issues with tax policies have motivated a number of studies of tax incidence on developing countries over the years, more typically on a tax by tax basis rather than as studies of the whole system. By and large, these studies follow the same shifting assumptions approach used in the conventional Pechman-Okner type of developed country incidence analyses, and do so in a relatively uncritical way. As a result they tend to reach similar conclusions regarding the incidence of several of the taxes that make up the wider tax system to these that one would find in the more standard developed country analyses. A small number of recent studies have examined tax incidence using general equilibrium techniques (see e.g., Habito, 1984, Bovenburg, 1988, and Chowdhury, 1990), although the important non-tax institutional features of developing countries which we stress later in this paper do not receive significant attention in this work.

On a tax by tax basis, the main incidence themes emerging from this literature are as follows.

Value Added Taxes (VAT)

In general, all studies find a uniform rate VAT to be a regressive tax, while also arguing that this regressivity could be reduced by having differential rates for different commodities and a supplementary system of excises on "luxury goods". These incidence analyses of the VAT have generally been based on the assumption of full forward shifting.[10] The tax is usually simply allocated among income brackets using data on consumption expenditures. Some recent studies have used an input-output framework to take into account differential rates and exempt commodities (see Ahmad and Stern, 1988, Ahmad and Ludlow, 1989, and Bird and Miller, 1989a, 1989b) while continuing to (implicitly) assume full forward shifting.

Other Sales Taxes

Conclusions reached on the incidence effects of manufacturer and wholesale level sales taxes are similar to those for the VAT i.e. such taxes appear as regressive. Full forward shifting is again generally assumed. Despite the widespread use of forward shifting, it is claimed in

many developing countries that producers and wholesalers typically apply a fixed percentage mark-up to prices, and that therefore full forward shifting does not occur. Econometric studies tend to support this point of view, such as Jeetun's (1978b) study of Pakistan which finds only 35% forward shifting from increases in the manufacturer's level sales tax.

Excises

Incidence analyses of excise taxes are once again typically based on an assumption of full forward shifting. A progressive incidence pattern is usually obtained for excises in aggregate. A notable exception is taxes on tobacco and cheap liquor, which usually have a regressive incidence pattern as in developed countries, because of relatively heavier consumption by the poor. The tobacco tax was found to be regressive in Colombia (McLure and Thirsk 1978, Cnossen, 1977) and in Argentina, Guatemala, and Greece (see Cnossen 1977 and Bird and Miller 1989), but progressive in Lebanon (Cnossen 1977). Cnossen (1977) finds a regressive incidence and Asher and Booth (1983) a progressive impact for this tax in the Philippines. Some excises such as motor fuel taxes combine aspects of taxing luxury consumption, combining ability to pay and taxes on the use of public services (benefit taxes or user charges). To the extent that these taxes serve as user charges, distributional consequences as captured by conventional tax incidence analysis may be of minor consequence for policy.

Available econometric evidence is once again at variance with the full forward shifting assumption. For example, Naqvi (1975) and Jeetun (1978b) estimated the extent of forward shifting in Pakistan of excises at 48% and 31% respectively.

Import Duties

Import duties are usually assumed to be fully forward shifted to consumers of imported goods, with a regressive or proportional incidence outcome the standard result (see Jeetun (1978a)). Most developing country incidence studies ignore the implications of quotas and import licensing for the shifting assumptions used.

General Indirect Taxes

When considered as a group, indirect (general sales, excise, and trade/import) taxes are almost universally assumed to be shifted forward to

consumers of taxed commodities. With a few exceptions (see Radhu 1965), backward shifting and incomplete forward shifting have not received much attention. These taxes are found to have a U-shaped incidence pattern, with some regressivity in the lower income ranges for the urban and rural poor (due to general sales taxes, taxes on tobacco and cheap liquor), progressivity in the top income brackets (due to taxes on motor fuels, liquor and other luxuries) and a flat incidence profile for the remaining groups (see e.g. Foxley et al, 1979 for Chile and Jeetun 1978, and Malik and Saqib 1989 for Pakistan).

Export Taxes

Primary products dominate exports from many developing countries. For commodities where no single country or a small group of countries dominates the world market, little forward shifting of the tax to foreign buyers should occur. Most incidence studies, therefore, assume that the incidence of export taxes falls on the producer-exporter group, and, correspondingly, derive a progressive incidence pattern since these are in the higher income ranges. One recent study for Sri Lanka (Jayasundera, 1986) interestingly also considered implicit subsidies to domestic consumers associated with export taxes on tea and rubber, and found these implicit subsidies were distributed in a pro-poor fashion. The pro-poor incidence effects of taxes can thus be reinforced by pro-poor incidence effects of implicit subsidies.

Personal Income Taxes

Personal income taxes are assumed to fall on individuals who pay these taxes. All developing country incidence studies thus show personal income taxes to be progressive. All these studies, as far as we can ascertain, ignore complications stemming from tax evasion (which we discuss later).

Corporate Income Taxes

The shifting assumption commonly used in developing country incidence work for the corporate tax is that 50% of the tax is shifted forward to consumers and 50% is borne by owners of capital in the economy. Under these assumptions, the usual incidence finding is a regressive

incidence profile for the lowest income brackets, a near flat incidence profile for the middle groups and a progressive incidence profile for the higher income groups.

Urban Property Taxes

The overall incidence of the property tax is found to be progressive in most developing country studies (see McLure 1971, 1972, 1977, 1979, 1987; Linn 1980; Bahl and Linn 1985; Holland and Follain 1985). For owner-occupied residential, commercial and industrial properties, the usual shifting assumption is that the tax falls on capital owners with no forward shifting. For rental properties varying degrees of forward shifting are assumed. In general, property taxes on owner occupied property are found to have a progressive incidence pattern, whereas the rented properties component of the tax is regressive. All available studies ignore tax capitalization effects, whereby the imposition of a property tax leads to a fall in the market value of the asset (see Chaudry-Shah 1988, 1989). With tax capitalization effects included, a properly administered property tax is likely to be somewhat more progressive than it appears under traditional assumptions.

Agricultural Land Taxes

With agricultural land taxes the usual incidence assumption is that taxes on large farms fall on land owners, and that for subsistence agriculture such taxes induce increased marketable surpluses resulting in a decline in agricultural product prices. An implication of this drawn in some studies (Qureshi (1987)) is that landowners bear more than the burden of the tax. As land ownership is generally concentrated in a few hands in most developing countries, a progressive incidence of such a tax is obtained under these assumptions.

Sectoral Incidence of Taxes

Although not emphasized in developed country studies, sectoral incidence of taxes is also frequently analyzed in developing country work, either for rural-urban or agriculture-non-agriculture groupings. Such studies usually make assumptions as to the fraction of tax passed between different sectors.

For example, a recent study for Pakistan (Qureshi (1987)) assumes that land taxes are borne solely by the agricultural sector; personal and corporate income taxes by the non-agricultural sector; export taxes on agricultural commodities by the agricultural sector and on manufactured goods by the non-agricultural sector. Import duties are allocated to consumption patterns of dutiable imports; and other indirect taxes by relative weights in consumption. Under these assumptions, the agricultural sector emerges as overtaxed relative to the non-agricultural sector.

The same conclusion is also reached by Kazi (1984) for Pakistan and Lipton (see Toye 1978) for India and Jayasundera (1986) for Sri Lanka. Opposite conclusions are reached in several studies on India (see Mitra 1963 and Gandhi 1966). Jayasundera (1986) for Sri Lanka examines the relative tax burdens by income class in the modern (non-agriculture) and primary (agriculture) sectors, and concludes that low to lower-middle income individuals are relatively heavily taxed in the primary sector compared to the modern sector.

The Overall Tax system

Developing country tax incidence studies generally find the overall tax system to be broadly progressive (pro-poor), showing either a U-shaped (see e.g. Malik and Saqib, (1989) for Pakistan, McLure (1971) for Columbia) or a progressive (see e.g. Jayasundera, (1986) for Sri Lanka; Lovejoy, (1958) for Jamaica and Sahota, (1969) for Brazil) incidence pattern. Exceptions to this include Wasylenko (1985) for Jamaica, who finds an inverted U-shaped incidence pattern for the overall tax system, implying that the tax system redistributes from the middle income groups to the poor and the rich.

IV. Non-Tax Policy Elements in Developing Countries and Tax Incidence Analysis

Thus, shifting assumptions similar to those used in developed country incidence work are widely employed in tax incidence work on developing countries. Remarkably, almost none of the available studies takes into account central developing country features such as price controls, protection, rationed foreign exchange, credit rationing, urban

rural migration processes and other features. This is the case even though these may potentially radically change incidence analyses and implied policy conclusions for the countries studied.

One of the central points of this paper is that the mechanical application of developed country tax incidence approaches to developing countries can have pitfalls. A wider network of policies surrounds tax systems in these countries, and these have, in some way, to be taken into account in making incidence determinations. What might seem reasonable assumptions for developed countries can be very unreasonable assumptions for developing countries. The issue, then, is what kinds of assumptions and analyses should one use and for which kind of country.

Because the characteristics of individual developing countries are so varied, there can be no single tax incidence approach applicable to all of them. However, broad groupings of countries are still instructive for discussing developing country tax systems and their implications for tax incidence analysis. Table 3 presents a classification of types of developing countries and summarizes some of the key differences between them that need to be considered in tax incidence work.

A. Agrarian Economies with a limited tax base: Import duties and excises are primary source of revenue

These are primarily agrarian economies with heavy reliance on trade taxes and excises, including export taxes (on average 60% of central government revenues, see Appendix Table A.1). There are considerable differences in the share of trade taxes among individual countries and in an extreme case (Gambia), trade taxes constitute 78% of central government revenues (see Appendix Table A.1). Since these countries have a small export base, tax revenues primarily accrue from import duties. Thus, in analyzing tax incidence, one needs to focus largely on tariffs, and the import licensing and exchange control regimes.

In addition, in many of these countries a small number of traders exercise significant control over the entire import trade and earn monopoly profits. Import duties are likely to be borne out of these profits, because of quantity constraints on imports through import licensing. However, black market activity and smuggling may further complicate the

Table 3

OEVELOPING COUNTRY FEATURES IMPORTANT IN TAX INCIDENCE ANALYSIS

Significant Features for Tax Incidence Analyses	Country Type A Low Income Agrarian	B Lower Middle Income	C Higher Middle Income Semi-industrialized	D Newly Industralized Countries
1. International Trade Taxes large, if not dominant	X	X	X	
2. Limited Coverage of Income Tax	X	X		
3. Social Security/ Payroll Taxes Important			X	
4. Sales Taxes Important		X	X	X
5. Public Enterprises imply significant government ownership of the Corporate sector	X	X	X	
6. Foreign ownership important			X	X
7. Reasonably broad tax system, good compliance				X
8. Widespread tax evasion		X	X	
9. Quantity and price Interventions.	X	X	X	
10. Black markets widespread	X	X	X	

analysis. Income taxes in such countries are primarily paid by salaried employees, but are small and play only a small, or even, insignificant part in the tax system.

A large number of African countries and a few Asian countries, e.g. Bangladesh, Sri Lanka, Myanmar (Burma) and Nepal fit this category. In these countries, the informal sector almost completely escapes taxes. Substantial economic activity is carried out by owner-operated enterprises, cottage industries, and small size farm owners outside of the formal tax system.

B. Lower Middle Income Countries; still with narrow tax bases, but a more expansive tax system:

These countries have a small manufacturing base, and specific excises are relatively more important sources of revenue than trade taxes. These countries have manufacturing level sales taxes, and income and payroll taxes, although with only limited coverage. Smaller agrarian/commodity exporting countries in Central America, Caribbean and Latin America (excluding Brazil, Argentina, and Venezuela) fit this characterization (see Appendix Table A.2). Tax incidence analyses for these countries also depend critically upon the industry and product market structure for excisable commodities.

C. Higher Income, Semi-Industralized Countries with a more widespread tax system, but large scale tax evasion:

These countries have a significant manufacturing tax base and fairly sophisticated overall tax structure. Tax evasion is, however, widespread, and the informal sector and the black economy are pervasive. In addition, public enterprises provide a significant source of government revenues (and/or expenditures through subsidies). Larger lower middle income countries in Asia (e.g. India, Pakistan, Indonesia, ASEAN excluding Singapore) and South America (e.g. Brazil, Argentina and Mexico) to varying degrees fit this categorization (see Appendix Table A.3).

D. Newly Industralized Countries with mature and advanced tax systems:

These countries have a sophisticated structure of income and sales taxes, which are much more effectively administered. Tax evasion and

compliance is not as serious a problem as in the countries in category C. As a result, developed country incidence approaches require less modification for use in these countries than for the other country groups. Higher income, high growth, and export oriented countries such as Korea, Taiwan, Singapore and Hong Kong all have tax systems that fit this characterization (see Appendix Table A.4).

V. Pitfalls in Applying Developed Country Incidence Analyses to Developing Countries

The large differences across developing countries stressed above suggest that what constitutes appropriate tax incidence analysis will differ from one country to the next. In particular, where they are important, non-tax institutional features, such as informal or black markets, urban-rural migration, credit rationing, industry concentration, product market competition, price controls, import licensing regulations, exchange controls, quantitative restrictions, and other features, they may need to be recognized and explicitly dealt with. Existing tax incidence work for developing countries, for the most part, ignores these considerations when making and reporting incidence calculations.

Thus while there is a significant body of literature on tax incidence in developed countries, which more recently has itself raised many unsettled issues, there are further questions as to whether conventional developed country incidence approaches can be applied to developing countries without more recognition of special developing country features.

Take, for example, the issue of the appropriate shifting assumption to use in analysis of the incidence of trade taxes, and in particular tariffs. In many developing countries the appropriateness or otherwise of an assumption of full forward shifting depends upon whether or not quotas are present, and, in turn, whether they are binding. Because they are a significant revenue source in lower income developing countries, whether they are treated as lumpsum taxes borne by recipients of rents from quotas, or passed forward to consumers in higher prices dramatically affects the conclusion of any incidence analysis of such taxes.[11] Indeed, rationed foreign exchange, prior import deposit schemes, and other forms of

quantity constraints on imports operate in many countries, and these can similarly affect the conclusion from incidence analyses. An assumption of forward shifting implies that tariffs (or other trade distortions) are treated in a similar manner to sales taxes in developed country analyses, and, hence, tend to be viewed as regressive. An assumption that tariffs are borne by recipients of quota rents because of import quantity constraints tends to make such taxes appear progressive, since rights to quota are usually allocated to higher income groups.

A further example arises with the sales tax which can also have different incidence effects from those in developed country analyses if a significant number of taxed commodities are affected by price controls as is common in many developing countries. If a seller of taxed products is legally permitted to pass such taxes forward, then the tax is fully shifted to consumers of taxed products, independently of any elasticity assumptions on the demand or supply side. If, on the other hand, the seller is not allowed to pass taxes forward, the tax is fully borne by the seller of the product. If, in addition, there are black markets, either a forward shifted or backward shifted sales tax will have effects on both black market prices and the quantity of activity on these markets. The effect of a forward shifted tax (by raising white market prices) may be to divert more expenditures onto the black market, drive up black market prices, and shorten the length of queues on white markets. Since the rich are frequently alleged to transact more heavily on black markets, these second round effects will shift proportionately more of the burden of such taxes onto the rich.[12] These effects are also typically not considered in existing developing country incidence analyses.

Incidence analysis of the corporate tax can also be affected by special developing country considerations. If there is a foreign tax credit and the corporate tax applies to a foreign-owned (either fully or majority foreign-owned) corporation operating in a developing country, then the tax will largely be paid by the foreign treasury and, as such, has no direct domestic incidence effects. In addition, in some developing countries manufacturing and distribution corporations are wholly or heavily government owned, complicating the usual backward shifting assumption that capital fully bears the burden of the tax. Also, if there is credit rationing, as is common in many developing countries, this can further

affect the perceived incidence of the tax. This is because with credit rationing, the corporate tax will primarily take rents away from those who qualify for rationed credit.

Thus, the interaction of taxes with other policy interventions seems, a priori, so important for most developing countries that one simply has to take them into account when analyzing their incidence effects. This is because the tax system co-exists with a much wider network of policies in developing countries, and these can substantially change the perceived incidence of taxes relative to developed countries. Many of these policy elements do not operate in developed countries, and so are neglected in developed country analyses. Because the tax system absorbs such a large share of national income in developed countries, the direct effects of taxes often dominate whatever additional effects may come into play from other policy interventions of governments. In developing countries, the opposite is usually true. Taxes account for a smaller share of national income, other factors are more important and become correspondingly more relevant for incidence analysis.

How these interactions with other policies can potentially affect developing country tax incidence analyses is illustrated in Table 4. In the table, developed country shifting assumptions conventionally used are listed for each tax, with an indication as to how a range of special developing country complications can result, from effects on recipients of rents to effects on urban-rural migration patterns. These change both shifting assumptions and incidence conclusions relative to conventional developed country incidence analyses. The implication seems to be that conventional shifting assumptions therefore need to be approached with some care when used in tax incidence analysis for developing countries.

VI. Import Licensing, Foreign Exchange Rationing, Quotas and Incidence Analysis of Trade Taxes (Tariffs)

As noted above, many developing countries raise a significant portion of revenues from trade taxes. Developing country tax incidence analyses usually treat trade taxes as synonymous with sales taxes, and as fully passed forward to consumers of imported products. As with sales taxes in developed countries, these therefore emerge from developing country incidence analyses as proportional or regressive.[13]

Table 4

SOME DEVELOPING COUNTRY CHARACTERISTICS
AND THEIR IMPLICATIONS FOR SHIFTING ASSUMPTIONS AND TAX INCIDENCE ANALYSES

	Conventional Developed Country Incidence Assumptions	Differences From Effects on Rents	Differences From Effects on Black Markets and Tax Evasion	Differences From Effects on Rural-Urban Migration	Differences From External Sector Complications
Income Tax	Paid by recipients.	None	Increased evasion from rate increases, effective progressivity of tax is reduced or offset.	If expected wage equalized across modern and traditional sectors and if tax only paid in modern sector, some of the burden is shifted to the traditional sector through intersectoral wage effects.	None
Corporate Tax	Shifted backwards to owners of capital, or shifted forwards to consumers of taxed items.	With credit rationing, tax will be wholly or fully borne by recipients of rationed credit.	Production diverted to black market, raising white market queuing costs and hence black market prices. Tax can be borne by consumer and and producers supplying to both markets. Outcome depends on model form and elasticities.	None	If large degree of foreign ownership, and taxes are creditable abroad, corporate tax may be fully borne by Treasury of source (developed) country
Sales Tax	Paid by purchasers of taxed commodities.	If price controls apply, and legal pass-forward of tax disallowed, tax is fully borne by fixed factors in taxed sectors.	Taxes divert more production onto black markets, raising white market queuing costs and hence black market prices. Tax can be borne both by consumers and producers supplying to both markets. Outcome depends on elasticity values and other parameters.	If tax is paid only on sales of manufactures, and if these are more heavily consumed by urban residents, tax will affect rural-urban migration and intersectoral wage differentials. Tax will partly be borne by residents in urban sector.	Tax component on imports reduces rents accruing to recipients of import or foreign exchange licenses.
Trade Taxes	Paid by purchasers of taxed products for imports (via tariffs). Borne by sellers of tax exported products (via export tax).	With binding import quotas or rationed foreign exchange, tariffs reduce rents received by quota recipients rather than affect prices paid by consumers.	With smuggling, higher tariffs increase smuggling with higher rationing premia for foreign exchange, and higher prices for consumers on both black and white markets.	Protection (through tariffs and quotas) tends to increase urban production, urban wages and affects rural-urban wage differentials through induced migration.	Discussed in same row of table.
Payroll Tax	Employer contribution borne by employer; employee contribution by employee, or both contributions borne by employee.	None	Limited evasion of payroll taxes.	If tax paid on payroll in urban sector, induced effects on rural-urban migration, and rural labor bears some of tax burden.	None.

In most developing countries, on the import side trade taxes operate alongside import licences, which in turn, act as quantity constraints on trade. Beyond these, there may be foreign exchange rationing arrangements, and these may instead represent the binding restriction on trade.[14] It can also be the case that advance deposit schemes operate, under which importers are required to deposit foreign exchange for a specified period of time with the central bank before they are given permission to import.[15]

The binding restriction on imports is thus, frequently, a quantity constraint, with product prices in the domestic market determined by the severity of the quantity constraint. In such cases, tariffs have no effect on prices in the domestic market. Their effect is to transfer rents to the government which would otherwise accrue to the owners of rights of access to restricted imports. In most cases these are the recipients of import licences or rationed foreign exchange. In such a regime, trade taxes largely become lump sum, and have no flow-through effect to consumers in the form of higher prices.[16]

The incidence effects of trade taxes can thus be quite different from those portrayed by conventional analysis if the taxes are borne by recipients of quota or licences. If, as would seem plausible, these are predominately the wealthy, then trade taxes in developing countries can reasonably be argued to have progressive incidence effects, not the regressive or proportional effects which are usually reported in currently available incidence studies.

The differences between using conventional shifting assumptions and the alternative assumptions which the discussion above suggests are explored in Table 5 which reports incidence calculations for trade taxes using taxation and household income and expenditure data for Pakistan for 1984-85. Using traditional assumptions, trade taxes are allocated to consumption expenditures in general. This results in a regressive (pro-rich) incidence pattern similar to available studies. Malik and Saqib (1989), for instance, use input-output data to refine such calculations by estimating the import content of various consumption goods and using these estimates in their forward shifting incidence calculation. They also derive regressive (pro-rich) incidence effects of trade taxes (import duties) using 1978-79 data for Pakistan.

The discussion above suggests that under a quota and/or foreign exchange constrained trade regime, trade taxes will simply reduce rents accruing to recipients of import licenses and will have little or no effect on domestic prices. In panel B of Table 5, trade taxes (import duties and export taxes) are allocated to owners of capital income in general, reflecting an assumption that import licenses are received proportionally to capital income. This results in a progressive (pro-poor) incidence of trade taxes.

Since in Pakistan access to the import and export trade is even more concentrated, in only a few individuals who belong to the top income brackets, an alternative incidence calculation assumes that rents from licences accrue only to the top five income brackets in proportion to their share of capital income. The resulting incidence pattern for trade taxes (Panel C) is dramatically progressive (pro-poor).

VII. Price Controls, Black Market Premia, White Market Queuing Costs and the Analysis of Sales and Excise Taxes

The widespread use in developing countries of price controls for many items subject to sales and excise taxes can also make the mechanical application of the traditional developed country incidence assumption, that such taxes are borne by consumers of taxed products, treacherous.

If such a tax applies to a price-controlled item there is the legal issue of whether or not the supplier of the price-controlled item is allowed to pass the tax forward, since there may or may not be a legal provision allowing him to do so. Thus, in the presence of price controls (and ignoring for now any interacting effects with black or parallel markets), such taxes are either fully passed forward to consumers, or fully shifted backwards to recipients of factor incomes depending upon how the law is written. The incidence outcome does not depend on demand and supply elasticities in markets for taxed products, as in a typical developed country situation.

In most developing countries, however, price controls also spawn black or parallel markets, in part to avoid price controls, but also because of tax evasion. An important effect of a sales or excise tax, therefore, may be to change the relative size of black and white market

Table 5

INCIDENCE OF TRADE TAXES IN PAKISTAN UNDER ALTERNATIVE ASSUMPTIONS
(Tax as a percent of total income)

1984-85 Household income classes	Percentage of household (percent)	Traditional Analysis (A)	The New View (B)	The New View (C)
Under 7200	3.1	7.8	4.0	0.0
7200 - 8400	2.1	7.1	3.6	0.0
8400 - 9600	3.3	7.0	3.6	0.0
9600 - 12000	9.4	6.9	4.4	0.0
12000 - 18000	23.7	6.8	5.1	0.0
18000 - 23000	18.2	6.5	5.9	0.0
24000 - 30000	12.7	6.3	5.9	0.0
30000 - 36000	7.5	6.2	6.1	12.2
36000 - 42000	5.1	6.1	6.1	12.3
42000 - 48000	3.6	6.1	6.2	12.6
48000 - 54000	2.3	5.8	6.3	12.8
54000 plus	8.9	5.1	7.0	14.0

Overall Incidence Pattern	Regressive (pro-rich)	Progressive (pro-poor)	Highly Progressive (pro-poor)

Notes: Calculations are based on allocative series derived from Pakistan Household Income and Expenditure Survey 1984-85 (HHIES) and taxation data from Government of Pakistan, Public Finance Statistics 1987-88.

Case Descriptions:

Traditional Analysis (A): This reflects the traditional view that the burden of trade taxes falls on consumers of traded products. Calculations are based on trade taxes (import duties and export taxes) allocated to consumption expenditures.

The New View (B): This reflects the view that the burden of trade taxes falls on import and export license holders. Panel B calculations are based on attribution to capital income in general.

The New View (C): This reflects the same view as in Panel B that trade taxes simply reduce rents accruing to individuals holding import and export licenses. Rents are allocated only to the five capital income classes.

activity and this can also have important implications for any incidence analysis of their effects.

An indication of how these black market interactions can come into play can be seen from two recent papers by Mohammed and Whalley (1985) and Nguyen and Whalley (1989). These papers highlight the equilibrium conditions linking black and white markets, and show how price changes in white markets, due to, say, a tax, reverberate onto black markets.

Thus, if there are penalties for those caught transacting on black markets and endogenously determined search costs involved in transacting on white markets at the controlled prices (the larger the excess demand, the larger the search costs), buyers and sellers (assuming risk neutral behavior) on both black and white markets must face the same effective prices in equilibrium (gross of search costs, or net of expected penalties) on the two markets.[17]

For simplicity, we assume black market penalties are only imposed on sellers. Thus, for buyers

$$(2) \qquad P^B = \bar{P} + S$$

where P^B is the black market price, $\bar{P}$ is the controlled price on official (white) markets, and S are endogenously determined search costs faced by buyers on white (or official) markets.

And for sellers

$$(3) \qquad P^B - \gamma.K = \bar{P}$$

where γ is the endogenously determined probability per unit sale of being detected selling on black markets, and K is the penalty or fine rate per unit sold. Mohammed and Whalley, and Nguyen and Whalley both assume γ is an increasing function of the ratio of black market to official market sales. In this framework, changes in price controls change black market prices, the length of queues on white markets, and the risk of detection for black market traders. Lowering price controls increase the ratio between P^B and $\bar{P}$ and increases queuing costs on white markets. Stronger

enforcement designed to curtail black markets (higher γ) increases search costs on white markets, and can therefore decrease overall social welfare.

A sales or excise tax in this framework which is allowed to be passed forward will divert more activity to black markets, increase effective consumer prices (gross of queuing costs) and increase penalties paid by black market traders. The tax will thus be borne both on the production and consumer side of the economy and in ways quite different from conventional analysis. The incidence of the tax will also depend upon whether buyers or sellers are liable for the tax, a result different from conventional developed country analysis in which legal liability for taxes is seen as of no economic consequence.

Thus, if sellers on official markets are liable for the tax at rate t, the equilibrium conditions above change, so that for sellers across black and white markets;

$$(4) \qquad P^B - \gamma K_o = \bar{P}(1-t)$$

while condition (2) for buyers is unchanged. The effect of the tax is to divert sales to black markets lowering black market prices and increasing probabilities of detection. The lower black market prices, from (2), reduce queuing and search costs on white markets. Consumers (buyers) thus benefit from the tax through lowered black market prices and reduced white market search costs. This implies that producers (sellers) must more than bear the burden of the tax, reflecting the reduction in effective seller prices on black markets as well as white markets.

On the other hand, if buyers on white markets are liable for the tax, the equilibrium condition (2) is changed to (5).

$$(5) \qquad P^B = \bar{P}(1+t)+S$$

while condition (3) remains unchanged. In this case P^B will rise, which from (3) must produce an offsetting change in γ (the probability of detection). Sellers are no better off under the tax, while buyers (consumers) more than fully bear the burden of the tax through increased black as well as white market prices.

Thus, for sales and excise taxes appropriate incidence assumptions depend upon whether and how changes in black market activity are taken into

account as taxes change. If taxes increase the amount of activity taking place on black markets, their effect will be to increase queuing costs on white markets and through the equilibrium conditions linking black and white markets also raise black market prices. The incidence of taxes will, therefore, fall on consumers purchasing on both black and white markets through higher prices, as well as on producers.

Because data is not readily available which allow a link to be made between black market activity and the personal distribution of income, taking these effects into account in incidence calculations is not easy. Anecdotal evidence, however, indicates that the coverage of price controls and the size of black market activity in many countries is surprisingly large.[18]

VIII. Tax Evasion and the Incidence of Income Taxes

A further common feature facing tax policy makers in developing countries and neglected in incidence studies is tax evasion.[19] In developed country analysis, the conventional assumption when looking at the income tax is to assume that the tax is fully borne by the payer of the tax. In the presence of the form of evasion found in many developing countries, however, things change.

Thus in a simple model in which evasion involves bribery of officials, the bribe B is related to taxes owing, T, through the bribe rate τ. In practice, as Gang et al. (1989) suggest, the bribe rate, will be endogenously determined, although for simplicity here we assume it to be fixed.

(6) $\quad B = \tau.T.$

In this world, the effect of increasing tax rates will be to increase T, but also to increase B. If the bribe rate is high and tax compliance is low, the redistributive impacts of the bribe system will dominate the direct redistributive effects of the income tax. The relevant issue then is who receives the bribes.

One scenario is that, through a seniority system in public service, high officials with higher income and wealth receive a large portion (or the majority) of the bribes, along with professionals (accountants) who often act as "middlemen" in this process. Increasing the

income tax can thus trigger a reverse distributional process from middle class businessmen and others to wealthy elites, an entirely opposite conclusion to that one would obtain from applying conventional developed country incidence analysis to the income tax in developing countries.

The extent of evasion and its links to rent transfers in particular countries is difficult to determine. As yet, to our knowledge, no tax incidence work taking these effects into account has been undertaken. Anecdotal evidence referred to above (see footnote 18) once again suggests that this is an extensive problem in a number of countries.

IX. Rural-Urban Migration Effects and the Incidence of Income and Payroll Taxes

Yet another example of how important differences can arise between results from developed country incidence assumptions and those suggested by models incorporating key developing country characteristics arises with income and payroll taxes. A prominent feature of many developing countries over recent decades has been both a rapid increase in rural-urban migration during the developmental phase, and major concern over the rural-urban migration effects of policy changes. In a Harris-Todaro (1970) model, for instance, an rural-urban wage differential, via urban unemployment, yields an equilibrium condition with equal expected wages across the two sectors.[20]

Thus

$$W^R = \rho \bar{W}^u \tag{7}$$

where W^R is the rural wage rate, ρ is the probability of being employed in the urban sector, and $\bar{W}^u$ is the downward rigid urban wage.

In many developing countries, de facto, income and payroll taxes apply only to the modern sector which, in turn, can be equated with the urban sector. If the income tax operates as a tax on the urban sector only, increases in income taxes will affect urban-rural migration patterns. Taxes, in turn, affect the number of workers who remain in the rural sector, and affects rural wages. The traditional developed country incidence treatment of the income tax, namely that taxpayers fully bear the

burden of the tax out of the income they receive, is inappropriate in such a framework.[21] Part of the burden is shifted to rural workers who legally pay none of the tax. Similar issues arise with incidence analysis of payroll taxes.[22]

The potential importance of this effect can also be illustrated using data for Pakistan for 1984-85. In Pakistan only the urban sector is subject to personal income tax. A graduated gross revenue surcharge is imposed on the rural sector which acts as a pseudo income tax, but with minor revenue consequences. The traditional approach to the incidence of income taxes, which assumes that the burden of the tax falls fully on individuals with liability to pay such taxes is reflected in Panel A of Table 6. From this personal income taxes appear to be a progressive element in the overall tax structure in Pakistan.

The Harris-Todaro effect in incidence calculations is captured in two alternative calculations. Panel B of Table 6 reports calculations based on the assumption that a significant proportion of the income tax is shifted from the urban to the rural sector in the form of reduced wages for rural households earning less than Rs. 24,000 per annum (most potential migrants come from these income classes). The discrepancy between the taxation statistics and income tax payments data, as reported in the HHIES 1984-85, serves as a proxy for the total income tax burden borne by the rural sector. Under these assumptions, a regressive incidence pattern of the tax for the rural sector and an ambiguous pattern of tax incidence for Pakistan as a whole is obtained. The progressivity of the tax for the urban sector is maintained.

A variation on this theme is where part of the tax falls on all rural wages, as reported in Panel C of Table 6. This variant echoes the same theme as in results reported in Panel B.

X. Credit Rationing, Foreign and State Ownership and the Incidence of the Corporate Tax

The presence of credit rationing and foreign and state ownership provide yet further examples of how developed country tax incidence assumptions can be misleading in developing country tax incidence analysis, in this case of the corporate tax. Credit rationing, for instance, is a

Table 6

SENSITIVITY OF PERSONAL INCOME TAX INCIDENCE CALCULATIONS IN PAKISTAN TO ALTERNATIVE APPROACHES

(Tax as a percent of total income)

1984-85 Household Income Classes (R's)		A. TRADITIONAL VIEW			B. THE NEW VIEW I			C. THE NEW VIEW II		
		Urban	Rural	Pakistan	Urban	Rural	Pakistan	Urban	Rural	Pakistan
Under	7200	0	0	0	0	0.74	0.58	0	0.54	0.42
7200	8400	0	0	0	0	0.83	0.63	0	0.60	0.45
8400	9600	0	0	0	0	0.88	0.63	0	0.64	0.46
9600	12000	0	0	0	0	0.73	0.46	0	0.52	0.34
12000	18000	0.02	0	0.01	0.01	0.57	0.35	0.01	0.41	0.25
18000	24000	0.04	0	0.02	0.02	0.70	0.38	0.02	0.32	0.18
24000	30000	0.02	0.00019	0.02	0.01	0.01	0.01	0.01	0.29	0.13
30000	36000	0.20	0.00038	0.13	0.09	0.02	0.06	0.09	0.26	0.16
36000	42000	0.22	0.00036	0.16	0.10	0.02	0.07	0.10	0.31	0.17
42000	48000	0.40	0.00074	0.29	0.18	0.03	0.13	0.18	0.19	0.18
48000	54000	0.77	0.00017	0.50	0.35	0.01	0.23	0.35	0.18	0.29
54000	plus	1.33	0.00270	1.04	0.61	0.11	0.47	0.61	0.13	0.48
Overall incidence pattern		P	P	P	P	R	A	P	R	A

Notes: P: Progressive; R: Regressive and A: Ambiguous

Case Descriptions:

Traditional View: The burden of tax falls on whom it is levied. Calculations are based on actual tax collections by income class as reported in the Household Income and Expenditure Survey 1984-85. All figures from this survey are adjusted to bring the total in line with the Public Finance Statistics data. Note that the income tax collections reported for the rural sector are either due to tax originating from urban source income of rural households and/or from the graduated land revenue surcharge imposed on the rural sector.

The New View I: A tax on urban income through its impact on urban-rural migration depresses wages in the rural sector. In this case this impact falls on the wage incomes in the rural sector in the range of incomes upto Rs.24,000 per annum. The shortfall in reported tax collections by income class in the Pakistan Household Income and Expenditure Survey 1984-85 and total income tax collections for 1984-85 stated in Public Finance Statistics 1987-88 is attributed to wage incomes in the rural sector in the income range of upto Rs.24,000 and under.

The New View II: Same as the New View I except that the tax shortfall is borne by wages in general in the rural sector.

common element in the policy regime in many developing countries. If firms are subject to credit rationing, the corporate tax will operate as akin to a tax on pure rent, much as trade taxes fall on holders of licences if there are binding quotas. This differs from the trade tax case since the tax will be borne from rents accruing to stockholders of firms as a result of their access to rationed credit. Traditional cost of capital analysis as widely used in a developed country setting, as well as traditional incidence assumptions, will also not apply in the same way.[23]

The degree and extent of credit rationing is documented in the World Bank (1989).[24] This source suggests that 70% of the new lending by commercial banks in 1986 in Pakistan was directed by the Government. In India in 1986, 50% of the bank assets were required to be placed in reserve requirements or government bonds and 40% of the remainder to be lent to priority sectors at government dictated interest rates. In Brazil in 1987 and in Turkey in the early 1980's more than two-third of the credit was advanced either at government directive or at preferential rates. In Malaysia on the average 30% of the bank credit is directed by the Government. A large number of developing countries have also adopted complicated credit regimes and credit guarantees.

A further complication affecting tax incidence analysis in many countries is that a significant portion of the manufacturing sector is either foreign-owned or has substantial foreign involvement (see Table 7). If a foreign tax credit applies under the domestic law of the source country (such as in the U.S.), when investing in a developing country a portion of the corporate tax may be borne by the treasury of the foreign country from where the investment originated. In such circumstances, agonizing over the traditional polar assumptions of full shifting of the corporate tax back onto capital or forward to consumers may be inappropriate.

Finally, state ownership of the corporate sector introduces further complications for incidence analysis of the corporate tax. Table 8 indicates the state ownership and control of industrial undertakings in a number of developing countries. That part of corporate tax revenues raised from state owned enterprises represents an internal transfer of funds for the Government, with no direct incidence effects.

Table 9 presents incidence analyses of the corporate tax in Pakistan, for 1984-85 under alternative assumptions. The first three

Table 7

IMPORTANCE OF FOREIGN OWNERSHIP OF CAPITAL IN VARIOUS DEVELOPING COUNTRIES

	Capital of Foreign Affiliates (% GNP)	
	Year	%
Mexico	1982	7.0
Argentina	1983	23.9
Brazil	1982	11.1
Colombia	1984	15.8
Venezuela	1982	10.0
Hong Kong	1981	15.2
Indonesia	1982	10.9
South Korea	1983	1.9
Malaysia	1984	26.6
Singapore	1983	65.3
Taiwan	1981	2.0
South Africa	1982	22.8
Turkey	1983	0.5
Pakistan	1982	11.2 a/

Notes:

a/ Of total corporate capital stock.

n.a. Data not available.

Source: Mexico and Pakistan: World Bank staff estimates.
All other countries: John Dunning and John Cantwell, editors. (1987).

Table 8

NON-FINANCIAL STATE OWNED ENTERPRISE SHARES OF INVESTMENT FOR SELECTED DEVELOPING COUNTRIES

Country	Year	Percentage share of manufacturing investment
Zambia	1984	77.5
Burma	1984	69.8
Venezuela	1984	52.2
Guyana	1984	41.9
Tunisia	1984	38.7
Algeria	1985	37.7
Morocco	1985	33.1
Turkey	1985	30.5
Congo	1983	39.8
Tanzania	1984	28.0
Chile	1985	27.5
Bangladesh	1985	22.1
Mexico	1984	21.8
Portugal	1984	20.4
Brazil	1985	17.5
Pakistan	1987	17.3
Philippines	1984	15.3
Nepal	1984	14.1
Costa Rica	1985	13.2

Source: Pakistan: Government of Pakistan, Finance Division, Economic Survey 1987-88, p.111.
Other countries: Nair, G. and A. Filippides (1988).

Table 9

CORPORATE TAX INCIDENCE IN PAKISTAN UNDER ALTERNATIVE APPROACHES
(Tax as a percent of total income)

1984-85 Household income classes	Traditional Analysis (A)	(B)	(C)	The New View (D)
Under 7200	1.18	1.71	1.56	0.85
7200 - 8400	1.06	1.55	1.64	0.77
8400 - 9600	1.04	1.53	1.70	0.76
9600 - 12000	1.26	1.62	1.69	0.91
12000 - 18000	1.46	1.70	1.69	1.06
18000 - 23000	1.70	1.79	1.68	1.24
24000 - 30000	1.68	1.76	1.69	1.22
30000 - 36000	1.75	1.78	1.68	1.28
36000 - 42000	1.77	1.78	1.66	1.29
42000 - 48000	1.81	1.79	1.65	1.32
48000 - 54000	1.89	1.76	1.63	1.34
54000 plus	2.01	1.74	1.64	1.46
Overall Incidence Pattern	Pro-gressive	Pro-portional	Pro-portional	Pro-gressive

Case Descriptions:

Traditional Analysis

Case A: The burden of corporate tax falls on capital income in general.

Case B: Corporate tax burden is allocated one-half to capital income and one-half to consumption expenditures.

Case C: Corporate tax is allocated one-half to capital income and one-half to labor income.

The New View

Case D: The taxes paid by state-owned enterprises (22% of total corporate tax collections) have no distributional implications; similarly the taxes paid by foreign companies (5% of total) are assumed to be paid by foreign treasuries and have no incidence implications and; the remaining taxes (73% of total) are allocated to capital income in general.

panels report incidence calculations using variants of traditional developed country approaches. These calculations ignore such features of Pakistan's economy as credit rationing, and ownership of the industrial sector by both the Government and by foreign enterprises.

Under traditional assumptions, the corporate tax has a progressive incidence pattern if it is allocated to capital income but a proportional incidence pattern if a significant portion of the tax is allocated to either consumption or labor income. Panel D reports calculations which take into account some of the details of the corporate sector in Pakistan. 22% of total corporate tax collections in Pakistan are derived from state-owned enterprises and, therefore, this portion of the tax is removed in the incidence calculation. Another 5% of the tax take comes from foreign enterprises having access to some form of foreign tax credit against Pakistan tax liabilities, this portion is omitted from the incidence calculation. Remaining taxes are allocated to capital income in general. An overall progressive incidence of the corporate tax, but with lower effective tax rates is obtained.

XI. Some Policy Implications

It should be clear from the discussion above, that our criticisms of existing developing country tax incidence analyses are wide ranging. Interactions with the features central to developing country policy regimes need to be taken into account in such work, and, furthermore, the underlying incidence literature on developed countries on which so much of it is based is itself increasingly coming under challenge. Our belief is that existing incidence views are likely to be reversed and quantitative orders of magnitude substantially changed if more appropriate approaches were followed. In short, existing developing country tax incidence studies may well contain little useful information.

At the same time, implementing new approaches of the form we suggest is not easy. New models of developing country economies capturing how control regimes work are needed, data is a major (and in some areas possibly an insurmountable) problem, and no single uniform approach for all countries makes sense. While this may well seem overly negative, there are nonetheless more positive implications of our discussion worth emphasizing.

First, it seems clear, to us at least, that in this area, more explicit rather than implicit modelling would be helpful in future research. Agonizing over forward or backward shifting for this or that tax may be less helpful than writing down an explicit model in which the full implications of assumptions can be traced through. This we would see as eventually moving towards numerical general equilibrium tax modelling, similar to that now being done for developed countries, but with central developing country features captured (or at least those relevant to the country in question).

Second, even without new quantitative analysis, it seems to us that the discussion above challenges how one approaches developing country tax incidence questions relevant to World Bank operations, and, hence, what may need to be taken into account in lending decisions. Even though we argue that there are pitfalls with the incidence analyses for developing countries, and that it may be impossible to accurately state what the incidence of a particular tax is, our analysis does seem to us to shed new light on a whole series of developing country tax incidence questions which need to be understood in the institutionally richer framework which we suggest (see Table 10). We would suggest that it is the challenge to conventional thinking which our analysis implies, rather than the precise answers from particular incidence calculations which may prove important for tax policy evaluation for developing countries in the longer run .

For instance, discussion of taxation of agricultural incomes (which is a politically sensitive subject in many developing countries) needs to take into account the extent to which tax burdens can be spread to non-agricultural sectors through interactions with price controls and the black market activities we emphasize earlier in the paper. Also, incidence effects of the value-added tax are clearly affected by price and quantity controls through the trade component, as we emphasize above. Traditional analysis of incidence effects of the VAT treats the VAT as equivalent to a sales tax. The sales tax, in turn, is conventionally thought of as a regressive tax in developing countries, because this has been the consensus view in developed countries for so many years (even though this is changing for the reasons discussed above). Once the presence of quantity controls through import licensing are taken into account, then an effect of a VAT may simply be to take away rents from recipients of quota, through the

trade component of the VAT. And if these are wealthier individuals, then this can have a significant progressive incidence impact.

Similar issues arise with discussions of the tax mix in various countries. For instance, there is an on-going debate in Brazil as to the appropriate balance between the payroll tax and the value-added tax. Payroll taxes in Brazil are a combination of a series of individual contributions components, whose combined effect is substantial, perhaps in the order of 25 to 30 percent in the manufacturing sector. There has been discussion in Brazil as to whether this form of tax erodes international competitiveness and, therefore, heavier reliance on the VAT would be better. If evaluated within a developing country context, payroll taxes and VAT will each have different incidence effects than when evaluated using traditional developed country approaches. Thus, if the payroll tax largely applies to the manufacturing sector, some of the tax will be borne by labor in the agricultural sector as well as the manufacturing sector through the impact on the migration process. If the VAT is collected on products consumed in both the rural and urban areas, this will tend to weaken these effects. These considerations would be missing if a conventional developed country incidence approach was taken to the incidence analysis of tax mix issues.

The differences between tax incidence analysis capturing developing country features and those based on conventional developed country analysis can also be seen by considering what one might term a stylized Bank/Fund package of tax reforms. We would see such reforms as comprising four main components. The first is a general move towards reduction of trade taxes and trade liberalization in general. The second is an emphasis towards production or consumption taxes, particularly through the value-added tax. The third is a movement towards reducing personal tax rates and consolidating the number of brackets. The fourth are moves to encourage reductions in corporate tax rates, and also grant tax incentives to inward foreign investment.

A traditional analysis of the incidence effects of such a package would be along the following lines. Reductions in personal tax rates would tend to be somewhat regressive, and if the corporate tax is borne by capital and capital is more heavily owned by higher income groups, reductions in corporate taxes would also tend to be regressive. Value-

added taxes are indirect taxes of a consumption type, and an increase in them also tends to be regressive. This whole package, therefore, would tend to be seen as a move towards a more regressive tax regime, a feature about which there could be substantial agonizing in policy making.

Under the alternative view of the world which emerges from this paper, it seems to us equally defensible to suggest that the value-added tax is a progressive rather than a regressive tax, that significant portions of the corporate tax in various countries are borne by foreign treasuries rather than borne by domestic capital, that reductions in personal taxes can have substantial incidence effects in the opposite direction because of the weakening in problems of evasion and administration, ultimately reducing transfers through a system of bribery and corruption to high-income groups. Thus, the incidence effects of each one of these taxes could well be quite opposite to the conventional wisdom asserted repeatedly in policy statements on possible incidence effects of such tax changes. Table 10 sets out the differences between conventional developed country incidence analysis and the views emerging here.

In conclusion, our discussion of developing country tax incidence literature emphasizes the difficulties associated with the implementation of alternative models and approaches, and the inconclusiveness of current tax incidence calculations. This may appear overly negative but we also emphasize the challenge our discussion seems to suggest for existing perceptions which permeate policy in this area. Taking these challenges further in more refined model based empirical calculations would seem to be the task for future work.[25]

Table 10

ALTERNATIVE VIEWS OF THE INCIDENCE OF TAXES IN DEVELOPING COUNTRIES

Tax Measures	Implications of Traditional Developed Country Analysis	Implications of the 'New' View, Capturing Developing Country Non-Tax Policy Features
Income Tax	Progressive	Ambiguous
Corporate Tax	Progressive or Proportional	Progressive
Broad Based Sales Tax (VAT)	Regressive	Progressive
Trade Taxes	Regressive	Progressive
Payroll Tax	Ambiguous	Ambiguous/Progressive
Urban Property Tax	Regressive/Progressive	Progressive

NOTES

1/ Most of the tax incidence literature on developing countries follows this tradition. Examples of recent studies include Malik and Saqib (1989) and Jayasundera (1986). For surveys of this literature see, for instance, Bird and de Wulf (1973), de Wulf (1975) and McLure (1977).

2/ See, for instance, Gillespie (1980), Pechman and Okner (1974), Musgrave, Case and Leonard (1974) and Browning (1978).

3/ This is the case with the conventional treatment of sales and excise taxes. A number of quantitatively less important uses side effects also occur, such as with excise taxes on alcohol and tobacco.

4/ See Davies, St. Hilaire and Whalley (1984).

5/ The main difference in the income concept relative to Pechman and Okner is what is included in transfers. This is discussed in more detail in Meerman (1980).

6/ A set of lifetime tax incidence calculations for Canada has recently been produced by Davies, St.-Hilaire and Whalley (1984), which, while not without problems, is nonetheless relevant to the discussions here. These calculations use a simulation model of life-cycle saving and bequest behavior for a representative sample of Canadian households to generate some of the distributive series required in an incidence calculation. As in the annual incidence calculations, each component of the tax system is allocated to households, now grouped by lifetime rather than annual income, and different distributive series are used relative to annual incidence calculations. The main implications from the DSW calculations is that there may be a stronger basis than from annual incidence calculations for the conclusion that the incidence of the overall tax system is mildly progressive. On the other hand, since inequality over the lifetime appears to be considerably smaller than in annual data, there seem to be less grounds for concern that the tax system does not do more to redistribute income, especially if the social costs of redistribution through induced inefficiencies are high.

7/ Chaudry-Shah (1989) advocates empirical analysis of capitalized burdens of the local property tax as an alternate approach to study property tax incidence. This (capitalization) approach represents a major departure from the traditional reasonable assumptions approaches to the study of the fiscal incidence of the local public sector.

8/ However, an argument by Ballentine (1981) complicates the implication that forward-shifting produces regressive incidence impacts, as in the Pechman-Okner and Gillespie calculations. Since forward-shifted taxes fall on capital goods as well as consumption goods, savers bear some of the burden of forward-shifted taxes. In Ballentine's study, around 26 percent of forward-shifted taxes are borne by savers, which significantly reduces the regressivity of the tax system calculated under forward-shifting assumptions.

9/ This tax rate is calculated on a net of tax basis; i.e., a 100% tax rate on net of tax income equal a 50% tax rate on a gross basis.

10/ For the popular incidence hypothesis (that prices are raised exactly by the amount of the tax) to be true, the supply of all commodities must be infinitely elastic. However, the condition of infinitely elastic supply for all commodities could not possibly be satisfied in any real world economy in the short run and possibly in the long run because resource constraints would become binding prior to the satisfaction of this condition. Most incidence studies also assume that factors of production are in fixed supply in the short run without recognizing its inconsistency with the "infinite elasticity of supply" assumption. In most developing countries both the domestic and foreign produced goods are almost always in limited supply. This scarcity is often the direct result of price controls, rationing of foreign exchange, import licensing and quantitative restrictions on imported raw materials and finished goods. The limited supply of commodities and rationing of some of these commodities create strong incentives for black market activities. Under such conditions, abnormal profits are earned by importers and local producers of relatively scarce commodities and therefore, any increase in indirect taxes could be borne out of these profits (see Prest 1985).

11/ See the discussion of the tax like effects of these elements of developing country trade regimes in Whalley (1989)

12/ See the modelling of black markets in Nguyen and Whalley (1985).

13/ See the calculations for Pakistan by Jeetun (1978a), for instance.

14/ See the discussion of trade effects of foreign exchange rationing in Clarete and Whalley (1986).

15/ Such schemes are still common in Africa, and can be found in Latin American countries currently experiencing import compression, such as Argentina.

16/ See the modelling analysis of the situation in the Philippines by Clarete and Whalley (1988) whose model results clearly demonstrate this point.

17/ A referee has argued that rather than black and white markets facing the same effective price in equilibrium, there may be rents in the latter that accrue to the privileged consumers.

18/ Several official and academic publications report anecdotal evidence on the extent of black markets and price controls in developing countries. For example, the Government of Pakistan estimates "black wealth" at 180 billion rupees or 41% of GDP in 1984-85 (see Government of Pakistan, National Tax Reform Commission Report, 1987, p. 104). Official estimates of black income in India range from 14.4% to 48.8% of GNP for various years (see Government of India, Ministry of Finance, 1985. See also Chugh and Uppal (1986) and

Chopra (1985). Mohammad and Whalley (1984, 1985) estimate the economic loss due to rent seeking in India in the order of 30 to 45% of GNP. Black-white market differentials in the foreign exchange market can also be substantial. For example, in Brazil and in Uganda, in December 1989, the black market premia in the exchange market was over 200% (see also Pinto, 1988).

19/ There is a substantial body of literature providing anecdotal evidence on the extent of tax evasion and bureaucratic corruption in developing countries (see e.g. Gould and Amaro-Reyes, 1983, Carino, 1986, Klitgaard, 1988). A few examples are reported here. For example, a confidential survey of chartered accountants carried out in India reported that 76% of the income tax officers accepted bribes. Furthermore, 68% of their clients paid an average bribe of 20% of the extra tax demanded (see Gang et al. 1989, p. 2). The Government of India (1985, p. 363) reports that less than 30 convictions result from about 4.5 million tax returns filed. Similarly, in Malaysia only 2 percent of the more than 20 thousand corruption cases investigated were convicted (see Gould and Amaro-Reyes, 1983). The Pakistan National Tax Reform Commissioner (1987, pp. 103-104) estimates that 72.4% of the income liable to tax escaped taxation in 1984-85. It is estimated that in Thailand 47% of revenues are lost through corruption and tax evasion (Carino, 1986, p. 53).

20/ See the extensive discussion of these issues in Grosh (1986). Heady (1987) and Heady and Mitra (1987) also consider rural-urban migration in optimal tax models.

21/ See Imam and Whalley (1985).

22/ See Whalley and Ziderman (1989) where this same point is made, and Imam and Whalley (1985) where incidence analyses of minimum wages in a two-sector Harris-Todaro framework are presented. Current reform debates on payroll taxes in Brazil within the Bank have also confronted these same issues as to how far tax burdens are dispersed through the effects to the rural sector.

23/ Auerbach (1990) discusses these issues in detail.

24/ See the World Bank (1989), pp. 55-57 for details.

25/ Clarete and Whalley (1990) have gone a considerable distance to meet this challenge. They develop an applied general equilibrium model for Philippines featuring tax and instutional distortions. The institutional distortions include quantitative import restrictions, Harris-Todaro labor market effects and foreign exchange rationing. Their model results confirm conclusions reached here.

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APPENDIX A

DATA ON REVENUE SOURCES BY TYPE OF COUNTRY

Source: (i) International Monetary Fund, Government Finance Yearbook, various issues.

(ii) The World Bank, The Bank Economic and Social Data Base (BESD). A computerized data base on developing economies.

Table A.1: Revenue Sources for Countries Having a Small Tax Base

Import Duties and Excises as Primary Source of Revenue

		Total Revenue	Income Tax	Individual	Corporate	Social Security Contributions	Employers Payroll Taxes	Taxes on Property	Domestic Taxes on Goods and Services	General Sales Taxes	International Trade Taxes	Other Taxes	NonTax Revenue
Bhutan	1984	1.00	0.13	0.04	0.09	NA	NA	0.01	0.35	0.05	0.00	NA	0.40
Burkina Faso	1987	1.00	0.21	0.09	0.03	NA	0.01	0.03	0.23	0.07	0.39	0.03	0.11
Burma	1986	1.00	0.06	NA	NA	0.00	0.00	0.00	0.39	0.34	0.14	0.00	0.40
Burundi	1981	1.00	0.22	0.10	0.11	0.03	0.02	0.09	0.29	NA	0.24	0.01	0.11
Central Afria Rep	1981	1.00	0.17	0.08	0.09	0.07	0.04	0.00	0.21	0.06	0.41	0.04	0.09
Chad	1987	1.00	0.21	0.14	0.06	0.00	0.03	0.03	0.09	0.03	0.46	0.06	0.12
Comoros	1987	1.00	0.11	0.02	0.09	0.00	0.00	0.01	0.11	0.09	0.54	0.01	0.22
Ethiopia	1981	1.00	0.25	0.07	0.14	0.00	0.00	0.03	0.22	0.08	0.28	0.01	0.21
Gambia	1987	1.00	0.13	0.05	0.07	0.00	0.00	0.00	0.06	NA	0.78	0.00	0.02
Guinea	1983	1.00	0.21	NA	NA	0.05	0.00	0.00	0.01	0.01	0.38	0.00	0.34
Haiti	1987	1.00	0.12	0.07	0.05	0.00	0.00	0.02	0.42	0.15	0.21	0.06	0.14
Madagascar	1982	1.00	0.14	0.06	0.12	0.00	0.00	0.02	0.37	0.23	0.20	0.01	0.03
Mali	1987	1.00	0.08	0.04	0.04	0.05	0.01	0.02	0.22	0.17	0.28	0.15	0.10
Nepal	1985	1.00	0.06	0.06	0.02	0.00	0.00	0.0	0.41	0.22	0.28	0.00	0.17
Niger	1980	1.00	0.24	0.08	0.16	0.04	0.00	0.03	0.18	0.12	0.36	0.00	0.15
Rwanda	1980	1.00	0.18	0.07	0.10	0.04	0.00	0.01	0.19	NA	0.42	0.01	0.14
Senegal	1984	1.00	0.20	0.13	0.05	0.03	0.02	0.02	0.29	0.23	0.42	0.01	0.06
Sri Lanka	1987	1.00	0.12	0.04	0.08	0.00	0.00	0.04	0.37	0.25	0.31	0.00	0.17
Tanzania	1985	1.00	0.26	0.10	0.16	0.00	0.00	0.01	0.57	0.56	0.09	0.02	0.05
Togo	1986	1.00	0.30	0.07	0.21	0.06	0.00	0.01	0.06	0.05	0.32	0.00	0.22
Vanuatu	1986	1.00	0.00	NA	NA	0.00	0.00	0.00	0.23	0.03	0.57	0.00	0.19
Zaire	1986	1.00	0.30	0.15	0.15	0.01	0.01	0.00	0.15	0.10	0.33	0.04	0.15
Average (Unweighted)		1.00	0.17	0.08	0.09	0.02	0.01	0.02	0.25	0.15	0.34	0.02	0.16

Table A.2: Revenue Sources for Countries with Narrow Tax Bases But A More Expensive Tax System

		Total Revenue	Income Tax	Individual	Corporate	Social Security Contributions	Employers Payroll Taxes	Taxes on Property	Domestic Taxes on Goods and Services	General Sales Taxes	International Trade Taxes	Other Taxes	NonTax Revenue
Bahamas	1986	1.00	0.00	NA	NA	0.08	0.00	0.03	0.09	NA	0.58	0.06	0.17
Barbados	1985	1.00	0.30	0.11	0.18	0.00	0.05	0.21	0.13	0.14	0.10	0.10	0.09
Belize	1985	1.00	0.20	0.16	0.04	0.05	0.00	0.01	0.11	NA	0.49	0.01	0.13
Bolivia	1984	1.00	0.06	0.04	0.02	0.21	0.00	0.01	0.17	0.04	0.30	0.02	0.23
Cameroon	1987	1.00	0.31	0.09	0.22	0.05	0.00	0.02	0.15	0.07	0.18	0.02	0.25
Congo	1980	1.00	0.39	0.07	0.33	0.04	0.01	0.00	0.06	0.06	0.10	0.01	0.19
Costa Rica	1985	1.00	0.11	0.10	0.00	0.25	0.00	0.00	0.26	0.15	0.21	0.01	0.15
Cote d'Ivoire	1984	1.00	0.11	0.06	0.04	0.04	0.04	0.03	0.16	0.08	0.27	NA	0.30
Cyprus	1987	1.00	0.21	0.15	0.03	0.17	0.01	0.03	0.18	NA	0.17	0.05	0.19
Djibouti	1986	1.00	0.16	0.11	0.06	0.00	0.00	0.05	0.50	0.29	0.05	0.02	0.07
Dominican Rep	1986	1.00	0.18	0.07	0.11	0.03	0.00	0.01	0.37	NA	0.32	0.01	0.07
Guatemala	1982	1.00	0.12	0.02	0.10	0.12	0.00	0.01	0.33	0.21	0.15	0.13	0.15
Guyana	1983	1.00	0.30	0.10	0.19	0.15	0.00	0.02	0.29	0.21	0.11	0.01	0.13
Honduras	1981	1.00	0.24	0.07	0.17	0.00	0.00	0.01	0.26	0.07	0.42	0.01	0.06
Jamaica	1981	1.00	0.31	0.16	0.15	0.04	0.02	0.02	0.47	0.22	0.05	0.04	0.05
Lesotho	1985	1.00	0.11	0.06	0.03	0.00	0.00	0.00	0.10	0.08	0.68	0.00	0.11
Liberia	1987	1.00	0.34	0.28	0.05	0.00	0.00	0.01	0.32	0.03	0.27	0.01	0.04
Malta	1986	1.00	0.25	0.13	0.11	0.17	0.00	0.02	0.06	NA	0.21	0.00	0.29
Mauritius	1987	1.00	0.10	0.05	0.05	0.04	0.00	0.04	0.18	0.07	0.50	0.00	0.13
Morocco	1986	1.00	0.19	0.10	0.06	0.05	0.00	0.03	0.48	0.24	0.14	0.05	0.08
Nicaragua	1986	1.00	0.14	NA	NA	0.10	0.00	0.03	0.48	0.09	0.07	0.01	0.09
Oman	1987	1.00	0.21	NA	0.21	0.00	0.01	0.00	0.01	NA	0.02	0.00	0.75
Paraguay	1986	1.00	0.12	NA	0.12	0.13	0.01	0.06	0.26	0.06	0.11	0.11	0.15
St. Christopher	1985	1.00	0.10	0.00	0.10	0.11	0.00	0.01	0.22	0.18	0.26	0.03	0.24
St. Lucia	1983	1.00	0.28	NA	NA	0.05	0.00	0.01	0.18	0.13	0.34	0.01	0.14
Suriname	1986	1.00	0.35	0.21	0.14	0.06	0.00	0.00	0.09	0.00	0.23	0.03	0.24
Syria	1986	1.00	0.25	0.00	0.24	0.00	0.03	0.04	0.09	0.04	0.07	0.05	0.47
Tunisia	1984	1.00	0.12	0.06	0.06	0.08	0.01	0.02	0.20	0.06	0.28	0.01	0.26
Yemen	1987	1.00	0.13	0.08	0.05	0.00	0.00	0.01	0.13	NA	0.29	0.14	0.29
Zimbabwe	1985	1.00	0.42	0.26	0.15	0.00	0.00	0.00	0.30	0.19	0.16	0.01	0.10
Average (Unweighted)		1.00	0.20	0.10	0.11	0.07	0.00	0.02	0.22	0.12	0.24	0.03	0.19

Table A.3: Revenue Sources for Countries with Widespread Tax Systems and Large Scale Tax Evasion

		Total Revenue	Income Tax	Individual	Corporate	Social Security Contributions	Employers Payroll Taxes	Taxes on Property	Domestic Taxes on Goods and Services	General Sales Taxes	International Trade Taxes	Other Taxes	NonTax Revenue
Argentina	1984	1.00	0.03	0.00	0.00	0.24	0.00	0.03	0.43	0.12	0.13	0.04	0.10
Brazil	1986	1.00	0.21	0.01	0.07	0.28	0.05	0.00	0.20	0.03	0.02	0.00	0.23
Chile	1987	1.00	0.14	0.04	0.10	0.07	0.00	0.01	0.42	0.31	0.10	0.06	0.20
Colombia	1987	1.00	0.27	0.13	0.14	0.08	0.04	0.00	0.27	0.22	0.19	0.02	0.11
Egypt	1987	1.00	0.14	0.01	0.11	0.13	0.00	0.01	0.11	NA	0.12	0.06	0.34
Gabon	1985	1.00	0.45	0.03	0.40	0.00	0.01	0.00	0.07	0.05	0.15	0.00	0.32
Greece	1985	1.00	0.18	0.13	0.03	0.35	0.00	0.02	0.36	0.19	0.01	0.06	0.10
India	1987	1.00	0.14	0.06	0.07	0.00	0.00	0.00	0.37	0.01	0.26	0.00	0.20
Indonesia	1987	1.00	0.48	0.03	0.43	0.00	0.00	0.01	0.18	0.14	0.06	0.00	0.24
Iran	1986	1.00	0.21	0.03	0.19	0.14	0.05	0.03	0.11	0.01	0.12	0.00	0.33
Malaysia	1987	1.00	0.34	0.10	0.24	0.01	0.00	0.00	0.19	0.06	0.17	0.02	0.27
Mexico	1987	1.00	0.27	0.12	0.15	0.09	0.01	0.00	0.65	NA	0.06	0.00	0.09
Pakistan	1986	1.00	0.11	NA	NA	0.00	0.00	0 00	0.33	0.05	0.33	0.00	0.23
Panama	1986	1.00	0.23	NA	NA	0.19	0.00	0.02	0.15	0.06	0.12	0.02	0.26
Portugal	1984	1.00	0.24	0.09	0.05	0.22	0.02	0.02	0.33	0.13	0.03	0.06	NA
Thailand	1987	1.00	0.18	0.09	0.09	0.00	0.00	0.01	0.05	0.16	0.20	0.01	0.10
Trinidad & Tobago	1981	1.00	0.70	0.12	0.55	0.02	0.00	0.00	0.04	0.02	0.06	0.00	0.17
Turkey	1987	1.00	0.42	0.30	0.13	0.00	0.00	0.00	0.33	0.10	0.07	0.04	0.13
Uruguay	1986	1.00	0.08	0.03	0.04	0.27	0.01	0.04	0.43	0.25	0.14	0.05	0.05
Venezuela	1986	1.00	0.43	0.04	0.39	0.04	0.01	0.01	0.09	NA	0.23	0.00	0.18
Average (Unweighted)		1.00	0.26	0.07	0.18	0.11	0.01	0.01	0.28	0.11	0.13	0.02	0.19

Table A.4: Revenue Sources for Countries with Mature and Advanced Tax Systems

		Total Revenue	Income Tax	Individual	Corporate	Social Security Contributions	Employers Payroll Taxes	Taxes on Property	Domestic Taxes on Goods and Services	General Sales Taxes	International Trade Taxes	Other Taxes	NonTax Revenue
Hungary	1987	1.00	0.18	0.01	0.17	0.24	0.04	0.03	0.31	0.09	0.05	0.04	0.09
Israel	1986	1.00	0.35	0.24	0.07	0.06	0.03	0.01	0.30	0.27	0.05	0.00	0.19
Korea	1987	1.00	0.28	0.15	0.13	0.02	0.00	0.01	0.39	0.20	0.17	0.02	0.10
Poland	1986	1.00	0.26	NA	0.26	0.25	0.03	0.03	0.30	0.30	0.07	0.00	0.06
Romania	1985	1.00	0.00	NA	NA	0.17	0.12	0.00	0.00	NA	0.00	0.00	0.71
Singapore	1986	1.00	0.15	NA	NA	0.00	0.01	0.05	0.10	NA	0.02	0.03	0.35
South Africa	1985	1.00	0.53	0.26	0.24	0.01	0.00	0.01	0.32	0.25	0.03	0.01	0.09
Yugoslavia	1987	1.00	0.00	NA	NA	0.00	0.00	0.00	0.60	0.60	0.36	0.00	0.02
Average (Unweighted)		1.00	0.22	0.17	0.17	0.09	0.03	0.02	0.29	0.28	0.10	0.01	0.20