

III Income Tax Issues

Three preoccupations have loomed large in the minds of the Colombian authorities with respect to income taxes: (1) the effect of income taxes on investment; (2) as in the case of the value-added tax (VAT), the magnitude of the tax evasion; and (3) the revenue impact of the recently introduced inflation adjustment and the further modifications that might be needed in it. The analyses carried out in these areas are presented in this section.

Tax Reform and Investment

A major concern of the Colombian authorities has been the secular decline in economic growth through much of the 1970s and 1980s (see Ocampo (1991) and (1992)), which culminated in a low of 2.1 percent in 1991. Understandably, the authorities became concerned about the investment climate. Although the fall in the long-term growth rate may not necessarily be attributable to a fall in capital accumulation—the investment rate at constant prices has been fairly stable in the past two decades—it was generally believed that the Colombian tax system introduced a bias against investment. If this bias was removed, capital accumulation would accelerate, as would growth.

Reform has thus been focused on making the income tax more neutral to investment and its composition. Replacement of the corporation income tax by a cash-flow tax, which is conceptually a tax on consumption, has been sometimes suggested in the literature as a way of attaining this objective, as it discounts investment immediately. However, this tax has not yet been applied in any country.¹⁶ Several

forms of taxation of presumptive income, instead of actual income, have also been advocated.¹⁷ The preferred form is a flat-rate tax on the companies' gross assets, on the grounds that such a tax would encourage investment in companies that are able to extract from their assets a higher-than-average return and penalize the ones that get only a lower-than-average return.¹⁸ Such proposals have not been implemented in Colombia, although a concern about the effects of income taxation upon the incentives to invest was present in all the income tax reforms of the past decade.

In recent years, Colombia experienced three important direct tax reforms—in 1986, 1990, and 1992. These reforms were designed to prevent double taxation of enterprises and individuals and to remove obstacles to investment from the Colombian tax system. The 1986 reform gradually unified the profit tax rates of corporations and limited companies at 30 percent, which was identical to the highest marginal rate of individual income and capital gains taxes, while eliminating the tax on capital gains for stock transactions conducted through the stock exchange. After payment of the 30 percent company tax, the dividends paid out of the remaining 70 percent of the profits were exempted from the individual income tax. Hence, the reforms reduced the gap between the marginal productivity of capital and the rate of return obtained by individuals. Also, beginning in 1991, the capital gains tax was eliminated.

The 1992 reform introduced a method for the overall adjustment of taxes for inflation. It also extended the tax base to include state-owned enterprises, eliminated an additional tax on enterprises based on net worth, imposed a special five-year contribution on high-income persons (both natural and juridical), reduced the foreign remittance tax, and exempted foreign investment funds from taxation. A summary of

Note: In this section, "Tax Reform and Investment" was prepared by Erik Haindl; "Potential Versus Actual Revenue Collections" by David Dunn; and "Inflation Adjustment" by Osvaldo Schenone.

¹⁶See, for instance, Shome and Schutte (1993), and the references quoted therein. They conclude that the cash-flow tax "remains a theoretically attractive option with some practical disadvantages. Moreover, many unanswered questions remain for its implementation by a single country—especially a developing one—in an environment that will not necessarily accommodate its smooth and effective operation."

¹⁷For an early treatment of this issue, see Tanzi (1991).

¹⁸On this subject, see Sadka and Tanzi (1993). These authors traced back the idea to a seventeenth-century tax in the Principality of Milan, as reported by Carlo Cattaneo in 1839, who was quoted in turn by Einaudi (1959).

Table 4. Summary of Direct Tax Rates

(In percent)

	1986	1989	1992
Corporate taxes			
Net income of corporations	40	30	30
Net income of limited liabilities	18	30	30
Capital gains	40 or 18	30	30
Minimum income tax	8 percent net assets or 2 percent net revenue	8 percent net assets or 2 percent net revenue	7 percent net assets
Branch profits remitted abroad	20	20	19
Other payments remitted abroad	12	12	12
Foreign income	Taxed	Taxed	Taxed
Stock dividends	Taxed	Not taxed	Not taxed
Intercompany dividends	64 percent of dividends are taxed	Not taxed	Not taxed
Individual taxes			
Total income	0-49	0-30	0-30
Interest income	0-49	0-30	0-30
Dividend income	0-49	Not taxed	Not taxed
Capital gains on stocks	10-24.5	0-30	Not taxed
Other capital gains	10-24.5	0-30	0-30

Source: Price Waterhouse.

the main changes introduced by these reforms in direct taxes is indicated in Table 4.

There have been some further reform proposals, including McLure's (1988), which supported implementation of a consumption-type cash-flow tax to induce a higher level of savings and investment. However, the main practical drawback to this tax is that the United States and other capital exporting countries might not allow a foreign tax credit for a consumption-based tax. Therefore, the reforms have proceeded along traditional lines, incorporating nevertheless the express objective of accelerating economic growth.

However, the tax system was not the only element to play a role in the investment decisions in the Colombian economy. Other elements included a foreign exchange shortage, particularly in connection with the Latin American debt crisis in 1982; a domestic financing constraint, induced by the authorities' anti-inflationary policy; and structural trends associated with the "Dutch disease" effect of the coffee boom of the 1970s and the easy access to external financing.¹⁹

Nevertheless, the authorities are eager to reach a clearer understanding of the impact of the 1986 tax

reform on investment. The objective of the following exercise is therefore to explore quantitatively the potential impact of the 1986 tax reform on the investment rate. It is found that the tax reform of 1986 had a positive impact on investment. However, this positive impact was offset by other structural factors that took place simultaneously.

Assessing the User Cost of Capital

Appendix III describes the methodology used to estimate the user cost of capital and the marginal consumption sacrifice. The main difficulty encountered in estimating these values related to the updating of the capital stock series for Colombia.²⁰ It was therefore decided to build a capital stock series, based on a "one-hoss-shay"—or onetime—depreciation, which was then used to compute the user cost of capital presented in Appendix III. The resulting user cost of capital series for Colombia shows a declining trend, which reached 15.2 percent in 1991 (Table 5).

The user cost of capital can be interpreted in various ways, which are equivalent in equilibrium. First, the user cost of capital can be interpreted as the

¹⁹See Ocampo (1991) and Edwards (1984).

²⁰More dated capital stock series for Colombia were available. See, for example, Harberger (1969) and Clavijo (1990), among others.

Table 5. User Cost of Capital*(In percent per year; in real terms)*

Period	Rate
Average 1970–79	19.8
Average 1980–85	17.9
1986	16.8
1987	16.6
1988	16.1
1989	15.6
1990 ¹	15.3
1991 ¹	15.2

Source: IMF staff estimates.

¹Values for 1990 and 1991 have been estimated by taking into account the real interest rates of the financial system and the risk premium for 1989.

“rent” that an enterprise pays to lease a unit of physical capital. This rent depends on the price of the capital good, the interest rate, the taxes on earnings of capital, and economic depreciation.

A second way to visualize the user cost of capital acknowledges the fact that the large majority of enterprises buys capital goods using a combination of their own resources (equity capital) and borrowed resources (debt). The capital user cost is the minimum return that the purchased capital must yield in order to be able to pay the taxes, plus the minimum returns demanded by shareholders (equity capital) and creditors (debt). That is, the user cost of capital is the discount rate applied to the profile of the expected returns on a project to determine whether it is beneficial for an enterprise.

A third way to look at the user cost of capital is to recognize that, in maximizing their profits, enterprises will increase their capital until its marginal productivity is equal to the cost of using the capital. In this sense, the user cost of capital represents the marginal productivity of capital in equilibrium.

As indicated in Appendix III, the methodology used to measure the cost of using capital in Colombia is Harberger's (1969). To measure the marginal consumption sacrifice and to quantify the gap on the savings-investment market (that is, the difference between the marginal productivity of capital and the marginal consumption sacrifice), the economic agents in that market are assumed to be subject to marginal individual tax rates in the highest bracket.

Savings-Investment Gap

Direct taxes introduce a wedge between the interest and dividend payments by enterprises and what

Table 6. Gap in the Savings-Investment Market*(In percent)*

Year	Marginal Productivity of Capital	Marginal Consumption Sacrifice	Savings-Investment Gap
1986	16.8	6.1	10.7
1987	16.6	9.9	6.7
1988	16.1	9.4	6.7
1989	15.6	9.3	6.3

Source: IMF staff estimates.

the owners of capital effectively receive. This wedge constitutes the difference between the marginal productivity of capital and the marginal consumption sacrifice. As shown in Table 6, the savings-investment gap was reduced by about 4.4 percentage points (almost one half) as a result of the 1986 tax reform.²¹

The market risk premium is equivalent to the difference between the rate of return required by individuals on a market portfolio and a risk-free obligation. Estimated as a by-product of the methodology developed in Appendix III, the premium was about 12 percent in 1989 (Table 7). This premium is lower than that estimated by Carrizosa (1986) for an earlier period (15 percent), but it is high by international standards.

Effect of 1986 Tax Reform on the Investment Rate

The effect of the reduction in the savings-investment gap on the investment rate depends critically on the interest elasticity of the savings and investment schedules. The higher the absolute magnitudes of the elasticities of both schedules, the greater will be the impact of the tax reform on equilibrium investment.

In order to assess the quantitative impacts of the tax reform, a disaggregated simultaneous equation model for savings and private investment was developed. This is presented in Appendix IV. Private savings depend on variables such as the tax burden,

²¹The tax reform passed in late 1990 should have reduced it even further as a direct consequence of the elimination of the capital gains tax on shares of stock and the application of the inflation adjustment, which took effect in 1991 and 1992, respectively. This new reduction in the gap should have had a positive impact on the investment rate. In 1991, at the time of conducting this study, it was too early to assess the impact of the reduction.

Table 7. Market Risk Premium
(In percent)

Year	Rate of Return on Shares (After taxes)	Rate of Return on Debt (After taxes)	Market Risk Premium
1986	13.0	3.9	9.1
1987	19.3	3.8	15.5
1988	18.4	2.9	15.5
1989	16.3	4.2	12.1

Source: IMF staff estimates.

public savings, external savings, and the rate of return on savings (or marginal consumption sacrifice), and private investment is assumed to depend on the user cost of capital. Simple dynamic effects are allowed. Public savings, external savings, and public investment are considered exogenous variables in the model.

There are two main conclusions from the model. First, the 1986 tax reform had a positive impact on the investment rate. The reform caused marginal tax rates for individuals to go down and eliminated the double taxation of individuals and enterprises, thereby reducing the gap between the user cost of capital and the marginal consumption sacrifice. As a result, investment rose by 1.2 percent of GDP, induced in its entirety by increased private savings and private investment. Second, this potential positive impact was partially neutralized by structural factors, such as a decrease in external savings and an increase in the direct tax burden.

Table 8 presents data evaluating the various fac-

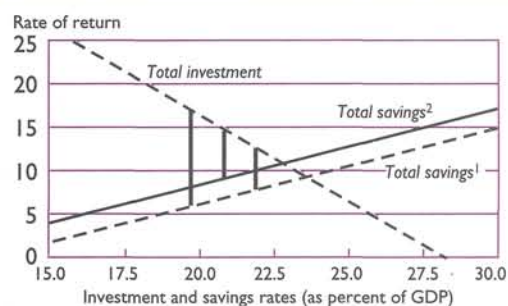
Table 8. Increase in Investment Rates, 1983–89

(In percent of GDP)

	Change in Variable	Effect on Investment
Increase in indirect tax burden	2.3	—
Increase in direct tax burden	1.4	–0.7
Increase in public savings	5.1	1.6
Decrease in external savings	6.7	–2.0
Tax reform	—	1.2
Residual (other factors)	—	0.5
Total change in investment rate between 1983 and 1989	—	0.6

Source: IMF staff estimates.

Chart 1. Investment and Savings
(In percent)



¹Considering only the tax reform.

²Considering the tax reform as well as other changes, such as a larger current account deficit and an increase in the tax burden.

tors that came into play during the period 1983–89. In 1989, the total investment rate was 0.6 percent of GDP higher than in 1983. While the 1986 tax reform lowered marginal tax rates and, owing to the reduction in the savings-investment gap, increased the investment rate by 1.2 percent of GDP, total tax revenues rose because of a bigger effort to reduce tax evasion. Direct tax revenues increased by 1.4 percent of GDP during 1983–89. Indirect tax revenues were 2.3 percent of GDP higher in 1989 than in 1983. This increased tax burden implied a negative income effect for the private sector, which experienced reduced private savings, and, hence, a reduction in the investment rate of 0.7 percent of GDP. There was also an increase in public savings of 5.1 percent of GDP between 1983 and 1989, which had a positive impact of 1.6 percent of GDP on total investment.²² Another important factor had a negative influence on total investment: the decrease in external savings (reflected, in turn, as a decrease in the current account deficit of the balance of payments), which reached 6.7 percent of GDP.²³ This reduction in external savings caused a fall in total investment by some 2 percent of GDP. All these effects are illustrated in Chart 1. Finally, there is an unexplained residual that accounts for a positive increase in investment of 0.5 percent of GDP.

²²In fact, public savings increased by more than the change in total tax revenues, which is consistent with the contractionary fiscal policy followed during that period by the Colombian authorities.

²³This decrease in the current account deficit represents a reduction of capital inflows, perhaps reflecting to some extent the impact of the Latin American debt crisis and the high real exchange rate policy pursued during this period (see Tanzi and Chu (1992)).

Table 9. Impact on the Investment Rate
(In percent of GDP)

1 Percent of GDP Change in the Variable	Effect on Total Investment (Short-term)	Effect on Total Investment (Long-term)	Effect on Private Savings (Long-term)	Effect on Private Investment (Long-term)
Increase in direct taxes (keeping public savings constant)	-0.43	-0.50	-0.50	-0.50
Increase in direct taxes (increasing public savings with these resources)	-0.15	-0.18	-1.18	-0.18
Increase in direct taxes (increasing public investment with these resources)	0.21	0.08	-0.92	-0.92
Reduction in public savings	-0.28	-0.32	0.68	-0.32
Reduction in external savings	-0.26	-0.30	0.70	-0.30

Source: IMF staff estimates.

Specific Impacts on the Investment Rate

The long-term effects during the period 1970–85 indicate that, for every increase in the direct tax burden of 1 percent of GDP, the rate of investment in the Colombian economy fell by about 0.5 percent of GDP. Moreover, a decrease in external savings equivalent to 1 percent of GDP caused a drop in investment of approximately 0.30 percent of GDP. Similarly, an increase in public savings equivalent to 1 percent of GDP led to an increase in the investment rate estimated at 0.32 percent of GDP. A summary of the estimated impact of the factors that affected the investment rate is shown in Table 9, taking into account just the income effect of an increased tax burden.²⁴

Table 9 indicates that an increase in direct taxation for government consumption purposes would have the biggest negative influence on investment. A rise in direct taxes to finance government consumption of 1 percent of GDP, if accomplished by increasing marginal tax rates, would cause a decline of 0.88 percent of GDP in total investment in the long run (0.50 percent owing to an increased tax burden and 0.38 percent to a widening in the savings-investment gap). If the same increase were accomplished by reducing tax evasion, only the income effect would be

present, and total investment would be reduced by 0.50 percent of GDP.

No significant effect of the indirect tax burden on investment was found. This means that private consumption experienced most of the income effect associated with an increased indirect tax burden in Colombia. Therefore, a rise in indirect taxes to finance government consumption of 1 percent of GDP could cause no measurable effect on total investment. Only a substitution of private consumption for public consumption should have taken place.

An increase in direct taxes of 1 percent of GDP to finance public investment, if accomplished by changing marginal tax rates, should have a negative long run impact of 0.30 percent of GDP in total investment. This would be the combined result of three effects: an income effect generated by the increased direct tax burden, which reduces investment by 0.50 percent of GDP; a substitution effect caused by a widening savings-investment gap, which would reduce investment by a further 0.38 percent of GDP; and a direct effect arising from increased public investment, which would have a positive impact on total investment of 0.58 percent of GDP. The latter effect is not a complete replacement (where a 1 percent rise in public investment increases total investment by 1 percent) because some crowding out of private investment would take place, owing to a higher interest rate (see Appendix IV). However, an increase in indirect taxes of 1 percent of GDP to finance public investment would have a positive impact of 0.58 percent of GDP on total investment. The results of the econometric model suggest that only the direct effect would take place.

Other interesting results are related to the effect of

²⁴An increase in direct taxation would normally be associated with higher marginal tax rates, which produce both income and substitution effects. If this were the case, increased rates that collected 1 percent more of GDP would imply a widening of the savings-investment gap, which would reduce the investment rate by a further 0.33 percent of GDP in the short run and 0.38 percent of GDP in the long run. This outcome can be derived from the $S = I$ estimated equation in Appendix IV.

public savings. An increase in public savings of 1 percent of GDP, if accomplished by reducing government consumption, would have a positive impact on total investment of 0.32 percent of GDP. The impact would not be one-to-one because of some crowding-out effects on private savings (see Appendix IV).

If the increase in public savings achieved by reducing government consumption were used to finance public investment, there would be a positive impact on total investment of 1 percent of GDP. In other words, switching from government consumption to public investment would have a one-to-one effect on total investment. In other cases, where the private sector is affected by income or substitution effects, some crowding out would occur.

If an increase in public sector savings of 1 percent of GDP were achieved by raising direct taxes through the use of higher marginal tax rates, there would be a decline in total investment of 0.56 percent of GDP. This would be the combined result of a fall in investment (owing to an income effect of 0.50 percent of GDP); a further decline in investment by 0.38 percent of GDP (caused by a widening of the savings-investment gap); and a positive impact on investment of 0.32 percent of GDP (owing to the increased public sector savings).

If an increase in public sector savings of 1 percent of GDP were achieved by raising indirect taxes, there would be an increase in total investment of 0.32 percent of GDP.

The change in external savings—the deficit of the current account of the balance of payments—also has a significant impact on total investment. An increase in external savings of 1 percent of GDP would increase total investment by 0.30 percent of GDP. The impact is not one-to-one because of an induced reduction in private savings generated by a crowding-out effect.

In Colombia, this change in external savings has been the single most important factor inducing a decline in total investment rates. As mentioned above, external savings were reduced by 6.7 percent of GDP between 1983 and 1989, which reduced the total investment rate by some 2 percent of GDP. The policy of high real exchange rates pursued by the Colombian Government, together with the implementation of restrictive fiscal and monetary policies, caused a significant improvement in the current account. In fact, the 1983 current account deficit of 5.2 percent of GDP was transformed into a current account surplus of 1.5 percent of GDP by 1989. However, this important macroeconomic result also reduced external savings and negatively affected the investment rate.

To conclude, had the 1986 tax reform not taken place, there would have been a decline in the total

investment rate from 1983 to 1989. The tax reform, together with other positive factors, such as the increase in public savings, prevented this situation from materializing.

Potential Versus Actual Revenue Collections

As in the case of the VAT, the authorities have been concerned with the extent of the evasion of income taxes. A study was therefore undertaken with the objective of quantifying income tax evasion, using as a basis initial endeavors by the Directorate of National Taxes (DIN).

A Summary of Studies Initiated by the DIN

The Center for Fiscal Studies (CEF) of the DIN initiated studies in 1992–93 that provided a good first approximation of income tax evasion over the period 1987–91. The studies used the “revenue gap” approach, which measures the difference between actual tax collections and potential revenue, as calculated by applying the tax law to relevant economic indicators. In addition to yielding credible estimates of overall income tax evasion, the CEF studies made use of data on tax collections by sector and type of taxpayer (namely, corporations and individuals) to produce disaggregated estimates of evasion (Table 10).

The key element in the CEF procedure is the use of the gross operating surplus (*EBE*)²⁵ in the national accounts as the measure of potential business income net of labor costs and purchases of materials or intermediate goods (see Table 11). To yield a figure that is more closely related to the concept of taxable income (*RA*), the studies subtracted from *EBE* estimates of income not subject to the income tax (*IF*), deductible interest payments (*CD*), and allowances for depreciation, amortization, and depletion (*CF*). The tax law further specifies income that is exempt from the income tax (*RD*), so one more adjustment was necessary before potential taxable income (*RE_p*) was obtained. Applying an effective tax rate to this figure and subtracting other creditable taxes yielded the final figure for potential tax revenue. Tax evasion was then calculated as the difference between potential revenue and actual tax collections, divided by potential revenue.

Because of the different tax treatment of corporations and self-employed individuals, the CEF studies derived evasion estimates for each group of tax-

²⁵The acronyms used are the Spanish ones in order to facilitate comparability for the researcher interested in dealing with Colombian sources.

Table 10. Estimates of Income Tax Evasion by the Center for Fiscal Studies
(In percent)

	1987	1988	1989	1990	1991
In percent of potential revenue					
Overall	33.2	38.1	32.2	28.5	28.6
Corporations	30.0	34.3	29.0	24.2	24.2
Agriculture	87	83	87	82	82
Mining	20	19	8	8	5
Manufacturing	12	11	10	10	6
Construction	46	61	65	75	62
Commerce, restaurants, and hotels	45	51	42	41	45
Transportation, storage, and communication	75	86	73	54	51
Finance	19	17	10	8	5
Services	8	18	48	35	37
Individuals	46.9	53.8	47.1	57.1	57.6
Agriculture	33	35	24	69	61
Mining	52	62	51	31	33
Manufacturing	76	72	67	69	65
Construction	58	70	72	75	74
Commerce, restaurants, and hotels	56	72	60	65	80
Transportation, storage, and communication	73	83	84	85	75
Finance	16	30	37	23	25
Services	41	53	57	54	75
In percent of GDP					
Overall	1.15	1.55	1.31	1.12	1.08
Corporations	0.84	1.13	0.97	0.83	0.79
Individuals	0.31	0.42	0.34	0.29	0.28

Source: The Center for Fiscal Studies, Directorate of National Taxes.

payers separately.²⁶ Also, in applying this procedure, the CEF studies relied heavily on information from actual tax returns. In fact, *EBE* was the only economic indicator used in the study that was not derived from tax returns. The distribution of *EBE* to the different categories of taxpayers and the determination of the components in calculating potential tax revenue were based on ratios of corresponding items in the tax declarations. For example, to divide *EBE* between corporations and individuals, the CEF studies used the share of gross income for each group as reported in the tax return data. Similarly, the deductions, such as depreciation allowances, were estimated by multiplying the share of *EBE* apportioned to the category under study by the share of the particular deduction in the gross income concept derived from the tax returns.²⁷ Use of this procedure

shows that evasion is essentially determined by the initial allocation of *EBE* to the group under study.

The remaining elements of the potential tax revenue calculation were derived in a similar manner from tax return data. Exempted taxable income was based on the ratio of *RD* to *RA* in the tax declarations, the effective tax rate was determined by the ratio of tax liability (*LA*) to net taxable income (*RE*), and the potential tax credit was the ratio of the credit (*LB*) to *LA* times the potential tax liability. Such calculations again suggest that the relative measure of evasion depends on the initial ratio of *EBE* to the gross income derived from the tax returns.

An Alternative Approach

The CEF approach had to be refined so that the components of the potential tax revenue calculation

²⁶As mentioned above, while corporations are taxed at a flat 30 percent rate, self-employed individuals are taxed according to a progressive tax schedule, with a maximum rate of 30 percent applicable.

²⁷As explained in Table 11, *EBE* corresponds in the studies to income net of operating costs before exemptions (*RA*), plus de-

preciation, amortization, and depletion allowances (*CF*), plus interest deductions (*CD*), plus revenues not constituting income or profits (*IF*). Depreciation allowances for group *i* would then be equal to

$$EBE_i \times CF / (RA + CF + CD + IF).$$

Table II. Formula Used by the Center for Fiscal Studies to Estimate Income Tax Evasion

Declaration of Income	Code	National Accounts
Income		
Net sales	IA	Gross operating surplus (<i>EBE</i>)
Services, honoraria, and commissions	IB	
Interest and financial earnings	IC	
Dividends	ID	
Other income	IE	
(-) Less revenues not constituting income or profits	IF	$IF/(RA + IF + CD + CF)$ <i>EBE</i> = <i>IFp</i> (potential)
Total income (IA through IF)	IG	
Costs		
Initial inventory	CA	
Purchases of materials	CB	
Wages and salaries	CC	
Interest and other financial expenses	CD	$CD/(RA + IF + CD + CF)$ <i>EBE</i> = <i>CDp</i> (potential)
Commissions, honoraria, and services	CE	
Depreciation and depletion allowances	CF	$CF/(RA + IF + CD + CF)$ <i>EBE</i> = <i>CFp</i> (potential)
Other costs and deductions	CG	
(-) Less final inventory	CH	
Total costs and deductions (CA through CH)	CI	
Net income ($IG - CI$)	RA	$EBE - IF - CD - CF = RAp$ (potential)
(-) Less nontaxable income	RD	(RD/RA) <i>RAp</i> = <i>RDp</i>
Taxable income ($RA - RD$)	RE	$RAp - RDp = REp$
Tax on taxable income ($RE \times \text{Tax Rate}$)	LA	$REp (LA/RE) = LAp$
(-) Less tax credits	LB	(LB/LA) <i>LAp</i> = <i>LBp</i>
Net income tax ($LA - LB$)	LC	$LAp - LBp = LCp$

Source: Special Administrative Unit, Directorate of National Taxes.

could be independently verified. A more thorough analysis, estimating specific elements of the potential revenue independently, was needed not only to improve the accuracy of the evasion estimates, but also to provide greater insight into the problem areas of tax administration. In response to these concerns, therefore, this analysis was attempted.

In a sense, this alternative approach is analogous to an aggregated tax audit. Just as a tax auditor looks for independent line-by-line verification when reviewing an individual taxpayer's return, this approach searches for data to verify each line in the aggregated tax declarations. While the approach clearly requires a more intensive data search—as applied to 1987–91 tax collections—it offers the potential benefit of identifying specific areas in which taxpayers may overreport deductions or underreport income.

As noted above, *EBE*, which is a measure of the gross return to capital, is an appropriate measure of income net of labor and material costs. However, typical national accounting conventions suggest that *EBE* will contain some items that are not appropriate for the income tax base and will exclude other items that are. In particular, national accounting often includes under *EBE* estimates for the implicit rental

income of owner-occupied housing, the informal sector of the economy, and income from illegal activities. However, *EBE* does not take into account interest and dividend earnings, which, although essentially mechanisms for distributing *EBE* to the owners of capital, are included in taxable income.²⁸

Appendix V provides the details regarding the adjustment made to *EBE*. Table 35, Appendix V divides *EBE* between corporations and individuals and, after introducing appropriate adjustments relating to imputed income from owner-occupied housing, illegal activities, interest, and inflation adjustment, obtains the adjusted income for tax purposes. Table 36, Appendix V, calculates separately for corporations and individuals the depreciation allowances for various categories of capital goods.

It is therefore possible to calculate roughly potential tax revenue (see Table 12), as the estimated components of taxable income can be used to derive potential taxable income. Specially exempted income has been excluded from this calculation, but a brief investigation of the relative importance of co-

²⁸Dividends earned by firms that hold shares of other firms are generally not taxable, if tax was paid on the income of the subsidiary firm.

Table 12. Calculation of Potential Taxable Income and Income Tax Evasion*(In millions of current Colombian pesos, unless otherwise specified)*

	1987	1988	1989	1990	1991	1992
Corporations						
(1) Adjusted income for taxes	2,562,514	3,405,550	4,700,835	6,394,689	8,188,369	9,886,385
(2) Interest deduction	983,876	1,228,691	1,755,622	2,235,968	2,722,161	2,537,076
(3) Depreciation, amortization, and depletion allowances	507,713	709,293	980,202	1,295,607	1,662,628	1,910,615
(4) Taxable income = (1) - (2) - (3)	1,070,925	1,467,565	1,965,011	2,863,113	3,803,580	5,438,694
(5) Potential tax revenue	321,278	440,270	589,503	858,934	1,141,074	1,641,493
(6) Exemptions, credits, and losses adjustment (in percent)	6.9	5.3	7.2	7.9	8.7	7.25
(7) Potential tax revenue = (5) - [(4) × (6)]	247,583	362,411	447,971	632,085	810,139	1,247,183
(8) Actual tax declared	173,392	254,319	358,871	524,562	655,526	...
(9) Relative evasion (in percent) = [(7) - (8)]/(7)	30.0	29.8	19.9	17.0	19.1	...
Individuals						
(10) Adjusted income for taxes	1,570,593	2,055,832	2,614,503	3,552,430	4,633,796	6,046,229
(11) Interest deduction	229,375	342,994	513,462	667,500	870,688	1,136,084
(12) Depreciation, amortization, and depletion allowances	56,735	90,674	129,292	169,669	223,844	253,971
(13) Taxable income = (10) - (11) - (12)	1,284,483	1,622,164	1,971,749	2,715,261	3,539,263	4,656,174
(14) Effective tax rate (in percent)	4.1	4.2	4.2	5.2	6.2	4.8
(15) Potential tax revenue = (13) × (14)	52,729	68,394	83,586	141,558	218,059	223,496
(16) Actual tax declared	32,796	42,821	55,641	75,930	106,904	...
(17) Relative evasion (in percent) = [(15) - (16)]/(15)	37.8	37.4	33.4	46.4	51.0	...
Total						
(18) Potential tax revenue = (7) + (15)	300,312	430,805	531,557	773,643	1,028,198	1,470,679
(19) Actual tax declared = (8) + (16)	206,188	297,140	414,512	600,492	762,430	...
(20) Overall relative evasion (in percent) = [(18) - (19)]/(18)	31.2	30.9	21.9	22.4	25.8	...

Source: IMF staff estimates.

operatives and community enterprises would allow a rough estimate to be made of this element. The estimate for potential tax revenue is then calculated by applying the statutory tax rate of 30 percent for corporations and the effective tax rate—derived from the data from tax declarations—for individuals.²⁹

The above-described procedure indicates that tax evasion among individuals has been particularly severe, increasing from about 38 percent in 1987 to 51 percent in 1991. However, corporate income tax evasion fell from 30 percent to 19 percent during the same time period. Given the weight of the latter, overall income tax evasion fell from 31 percent to 26 percent (Table 12).

The results largely reflect the shifting of interest deductions and depreciation allowances to corporations and the attribution by the national accounts of a majority of *EBE* to individuals, in sharp contrast to the implications of the data from the tax declarations. The exercise is, on the whole, a preliminary attempt at measuring income tax evasion: it was one of the first attempted using a set of Latin American data,

and it could be improved upon in the future.³⁰ For example, the data from the tax returns indicate substantial figures for “other income” and “other deductions.” Clearly, what these categories stand for should be investigated, and an attempt should be made to use independent sources to measure them.

Improving the Procedures

Three basic procedures could be utilized to maximize the results of the administrative efforts. First, as indicated above, a deeper search could be made for independent sources of data to verify various components of the calculated potential tax base. Just as an actual income tax audit would seek to verify a firm’s revenue and expenses, it would be useful to verify the tax returns at an aggregated level. Much of the necessary data for this analysis does exist, but it is a matter of sorting them for analytical purposes. The data might reveal substantial differences between the components of potential taxable income and the ac-

²⁹If more time had been available, a final adjustment for credits could have been made by using more detailed data from the tax declarations.

³⁰A first attempt was made in a similar vein by Aguirre and Shome (1988) to measure VAT evasion in Mexico. Subsequently, as mentioned in Section II, the methodology was further streamlined and applied to many other Latin American countries.

tual declarations. Detailed procedures for estimating income tax evasion are not yet common, and, in continuing this initial exercise, further refinements might be attempted.

Second, as Herschel (1975) points out, information from surveys and audits could provide valuable information on the breakdown of evasion between underreporting and nonreporting. Studies complemented with auditing results should reveal areas of strength and weakness in tax administration and aid the authorities in better directing their administrative resources and designing easier-to-enforce tax policies.

Third, a more thorough disaggregated analysis of tax evasion at the sectoral level might be undertaken. For example, if a major source of tax revenue, such as the oil industry, is well monitored and thought to have only minor evasion problems, it could be excluded from the sample so that evasion can be more precisely identified elsewhere in the economy.³¹ Such useful disaggregated data should be available from the national accounts.

Inflation Adjustment

The annual rate of inflation in Colombia during the 1990s has varied between 22 percent and 30 percent. The presence of inflation creates gains and losses that will be overlooked by ordinary accounting procedures and, hence, ignored in the determination of taxable income. Inflation adjustment was adopted in Colombia in 1992 to solve this problem. While the procedure adopted is essentially correct, it should be emphasized that the authorities' focus has been on identifying the corrections needed to maximize revenues under this procedure.

The Nature of the Problem

Inflation adjustment is not intended to eliminate inflation-created gains and losses, but to include them in the tax base with all other gains and losses. To identify such gains and losses, it is convenient to consider separately monetary and nonmonetary assets and liabilities in the balance sheet of firms. Monetary assets and liabilities are those whose values are eroded by inflation, such as cash in the vault or accounts payable (or receivable) in local currency. However, the value of nonmonetary assets or liabilities, such as buildings, inventories, or accounts payable (or receivable) in foreign currency or in kind, is protected from inflation. Only monetary assets can experience inflation-created losses,

and only monetary liabilities can experience inflation-created gains, as illustrated by the following example.

Suppose that a company buys a piece of machinery with a loan made in Colombian pesos. The accounts will show identical increases in total assets and liabilities. Moreover, under an annual inflation rate of 20 percent, the balance sheet will show no change after one year. The reality, however, is very different. With the mere passing of time, the value of the debt (assuming, for simplicity, that no amortization takes place during the year) has been eroded by one fifth, although the machinery is still intact. This constitutes a gain, which inflation adjustment would make taxable.

Another way of looking at the situation is to realize that, without inflation adjustment, the firm would deduct as a cost interest on the loan (for example, 25 percent per year if the real rate of interest is 5 percent), ignoring the fact that four fifths of that deduction really represents the inflationary erosion of the debt rather than a true cost. Such an omission is precisely what the inflation adjustment aims to correct.

In this example, the gain takes place in the monetary liability, not in the nonmonetary asset. In fact, the inflation-created gain would not have existed if the asset had been bought using own capital instead of debt, or if the firm had been required to repay the debt by delivering 100 tons of merchandise or US\$100,000.³²

Thus, the inflation adjustment of taxable profits consists of adding to the standard (unadjusted) profits the following:

$(\text{Monetary Liabilities} - \text{Monetary Assets}) \times \text{Inflation Rate}.$

This way of expressing the inflation adjustment, however, encounters strong resistance from accountants on two grounds. First, if monetary liabilities are adjusted, their value will no longer equal the amount of nominal debt originally contracted. Hence, when the debt is repaid, the account will fail to show a zero balance.

Second, if monetary assets are adjusted, several difficulties arise. First, the adjusted value of cash in the vault will not be equal to the amount of cash actually in the vault. Although, from an accounting viewpoint, Col\$1,000 in January and Col\$1,000 in December should be the same, inflation makes their values very different from one another in reality. Second, the value of accounts receivable will no

³¹The disaggregated data could be usefully consolidated for the purpose of carrying out more detailed analyses of tax evasion.

³²Regardless of the existence of inflation, 100 tons of merchandise or US\$100,000 will still have the same real value, although the nominal value may be very different. That is, inflation-created gains or losses cannot exist unless a monetary asset or liability is involved.

longer be equal to the original value. Hence, when the debtor repays his debt to the company, the accounts receivable item will fail to show a zero balance.

Although these objections may be of no consequence from an economic viewpoint, they create problems for accountants. Therefore, an equivalent procedure may be devised to overcome these accountancy objections. Given the identity

$$\text{Monetary Assets} + \text{Nonmonetary Assets} = \text{Monetary Liabilities} + \text{Nonmonetary Liabilities} + \text{Net Worth},$$

then

$$\text{Monetary Liabilities} - \text{Monetary Assets} = \text{Nonmonetary Assets} - \text{Nonmonetary Liabilities} - \text{Net Worth}.$$

Therefore, inflation-created profits and losses of any particular year can be alternatively written as

$$(\text{Nonmonetary Assets} - \text{Nonmonetary Liabilities} - \text{Net Worth}) \times \text{Inflation Rate}.$$

This is the way in which company profits are adjusted by inflation in Colombia, with certain variations.

Inflation Adjustment in Colombia

Inventories are adjusted by using a quarterly average of the annual rate of inflation for the purchases in each quarter. However, given that monthly rates of inflation are readily available, it would be more accurate to use the actual rates corresponding to each month.

Bonds and shares whose prices are quoted in the stock exchange are adjusted by the quoted price at the end of the period, instead of by the rate of inflation. This practice is a departure from pure inflation adjustment, and problems connected with taxing capital gains that have not yet been realized may arise.

A similar problem exists concerning the treatment of foreign-exchange-denominated assets and liabilities, or those with special indexation clauses. Instead of using the rate of inflation, the exchange rate or the indexation clause is utilized to adjust the values of these assets and liabilities.

Also, a provision in Colombian law allows for the waiver of the adjustment when the market value of a nonmonetary asset is less than 50 percent of the adjusted value. This provision has little to do with inflation adjustment, and not making the adjustment in these circumstances cannot be justified.

Another provision allows the postponement of the inflation adjustment for assets that are not yet in operation. Again, this is alien to the objective of inflation adjustment, which is to tax the profits arising

Table 13. Breakdown of the Inflation Adjustment of the 100 Largest Taxpayers, 1993

(In billions of current Colombian pesos)

Adjustment to nonmonetary assets	1,775.3
Inventories	244.2
Financial assets	215.8
Fixed assets	1,047.1
Other assets	254.4
Deferred monetary correction	13.8
Adjustment to nonmonetary liabilities	-215.8
Adjustment to deferred monetary correction	-9.1
Adjustment to net worth	-1,122.5
Adjustment to increase in net worth	-14.6
Adjustment for inflation	413.3

Sources: Division of Programming, Directorate of National Taxes; and IMF staff estimates.

from the inflationary erosion of the value of debt. If the asset was not financed with debt, there is no need for adjustment (either present or deferred); however, if the purchase of the asset was financed by debt, inflation is creating profits—regardless of whether the asset is already producing—and there is no reason to postpone the taxation of these profits.

Revenue Effects

A sample of the 100 biggest taxpayers (in terms of income tax paid in 1993) was used to assess the revenue effects of inflation adjustment. This sample represented almost 40 percent of the income tax revenue in that year. As Table 13 shows, an increase in the tax base of about Col\$413 billion in 1993 was due to the inflation adjustment. This calculation, however, needs to be refined, as it does not recognize that depreciation allowances of adjusted assets were greater than they would have been without the adjustment of those assets' values. It was estimated that the adjustment of asset values increased depreciation allowances by about Col\$82 billion (see Table 14).

Therefore, the corrected inflation adjustment amounted to about Col\$331.5 billion in 1993. With a tax rate of 30 percent, this would imply an increase in tax revenues, owing to the adjustment, of about Col\$100 million, or about 18 percent of the income tax revenue collected from the taxpayers in the sample. Thus, there has been no revenue loss as a result of inflation adjustment but indeed a net gain, even though, understandably, this is not consistent across all sectors.

Table 14. Corporate Income Tax: Adjustment for Inflation, Statutory Deduction, and Net Effect, 1993*(In billions of Colombian pesos)*

Sector	Number of Cases	Adjustment of Nonmonetary Assets				Adjustment of Nonmonetary Liabilities and Net Worth		Adjustment for Asset Depreciation (7)	Adjustment for Inflation ¹ (8)	Statutory Deduction	Net Effect ² (10)
		Inventories (1)	Financial assets (2)	Fixed assets (3)	Other assets and adjustments to deferred monetary correction (4)	Nonmonetary liabilities and deferred monetary correction (5)	Net worth (6)				
Mining	10	63.8	38.0	718.5	73.9	81.6	348.6	59.8	404.2	98.4	305.6
Food	11	29.4	78.5	67.0	10.3	2.7	160.5	2.1	19.9	1.7	18.3
Wood, cork, and paper	2	2.3	2.3	12.2	0.5	2.0	9.7	0.4	5.2	0.2	5.0
Chemicals	18	35.3	5.3	47.9	6.8	8.1	63.2	2.7	21.3	3.2	18.1
Minerals	15	33.1	10.0	40.6	4.5	4.1	58.8	2.5	22.8	3.6	19.2
Gas and vapor	2	0.4	—	11.1	0.2	0.4	5.9	1.4	4.0	0.3	3.7
Construction	1	—	19.1	0.5	1.9	—	21.1	—	0.4	—	0.4
Wholesale commerce	7	46.0	0.2	19.8	0.6	0.2	21.4	0.8	44.2	0.6	43.6
Retail commerce	5	21.8	—	5.1	1.2	1.5	10.4	0.5	15.7	0.8	14.8
Financial	25	—	54.8	89.3	165.8	122.6	379.3	7.5	-199.5	0.6	-200.1
Services	4	12.2	7.6	35.0	2.3	1.6	58.2	4.1	-6.6	—	-6.6
Total	100	244.3	215.8	1,047.0	268.0	224.8	1,137.1	81.8	331.5	109.5	222.0

Sources: Division of Programming, Directorate of National Taxes; and IMF staff estimates.

¹(8) = (1) + (2) + (3) + (4) - (5) - (6) - (7).²(10) = (8) - (9).